

STANDARDS DEVELOPMENT BRANCH OMNR  
36936000008283



## Drinking Water Surveillance Program

# OTTAWA (LEMIEUX ISLAND) WATER TREATMENT PLANT

### Annual Report 1987

TD  
380  
.088  
1988  
MOE



Environment  
Ontario

Jim Bradley, Minister

**TD**  
**380**  
**.088**  
**1988**

Ottawa (Lemieux island) water  
treatment plant : annual report  
1987.

79154

#### **Copyright Provisions and Restrictions on Copying:**

This Ontario Ministry of the Environment work is protected by Crown copyright (unless otherwise indicated), which is held by the Queen's Printer for Ontario. It may be reproduced for non-commercial purposes if credit is given and Crown copyright is acknowledged.

It may not be reproduced, in all or in part, part, for any commercial purpose except under a licence from the Queen's Printer for Ontario.

For information on reproducing Government of Ontario works, please contact Service Ontario Publications at [copyright@ontario.ca](mailto:copyright@ontario.ca)

ISSN 0840-5204

**OTTAWA (LEMIEUX ISLAND)  
WATER TREATMENT PLANT**

**DRINKING WATER SURVEILLANCE  
PROGRAM**

**ANNUAL REPORT 1987**

**ONTARIO MINISTRY OF ENVIRONMENT  
OCTOBER 1988**

c Queen's Printer for Ontario, 1988

#### ACKNOWLEDGEMENTS

The Drinking Water Surveillance Program (DWSP) employs a team approach requiring the co-operative effort of the Ministry of the Environment (MOE) staff from Water Resources and Laboratory Services Branch and the Regions, as well as plant operational staff from the Municipalities.

This annual report was produced by the DWSP Group (Ron Hunsinger, Peter Bohm, Carol Sackville-Duyvelhoff, Chris Fung and John McGrachan) and by Pat Lachmaniuk (on developmental assignment to the Drinking Water Section). Helpful input and reviews were received from Drinking Water Section Staff, in addition to reviews by other MOE and municipal personnel.

## EXECUTIVE SUMMARY

### DRINKING WATER SURVEILLANCE PROGRAM OTTAWA (LEMIEUX ISLAND) WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Ottawa (Lemieux Island) Water Treatment Plant is a conventional treatment plant which treats water from the Ottawa River. The process consists of coagulation, flocculation, sedimentation, filtration, disinfection, post pH adjustment and fluoridation. This plant, in conjunction with the Britannia plant, serves a population of approximately 515,000 people and has a design capacity of 299 x 1000m<sup>3</sup>/day.

Samples from the Ottawa (Lemieux Island) Water Treatment Plant raw and treated water plus two distribution system sites were taken on a monthly basis and analyzed for approximately 160 parameters. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticide and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed in June and November only.

A summary of results is shown in Table 1.

Fecal Coliforms were present in the October distribution system Site 2 sample. The District Officer was notified. Due to the sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of the water; however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOS) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below applicable health related ODWOS except on one occasion when the ODWO for Turbidity was exceeded in the treated water. The District Officer was notified.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Ottawa (Lemieux Island) Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

## SOMMAIRE

### PROGRAMME DE SURVEILLANCE DE L'EAU POTABLE

#### STATION D'ÉPURATION DE L'EAU D'OTTAWA (ÎLE LEMIEUX) RAPPORT ANNUEL 1987

Le Programme de surveillance de l'eau potable (PSEP) de l'Ontario fournit des informations immédiates, fiables et à jour sur la qualité de l'eau potable. Le PSEP a débuté officiellement en avril 1986. Il est destiné à englober tous les réseaux municipaux d'alimentation en eau de l'Ontario. Actuellement, 44 stations en font partie.

La station d'épuration d'Ottawa (île Lemieux) est une station classique qui traite l'eau de la rivière des Outaouais. Le traitement comporte la coagulation, la flocculation, la décantation, la filtration, la désinfection, l'ajustement du pH et la fluoruration. Cette station, avec celle de Britannia, dessert une population d'environ 515 000 habitants et a une capacité nominale de 299 x 1 000 m<sup>3</sup>/jour.

Des prélèvements d'eau brute et d'eau traitée ainsi qu'en deux points du réseau de distribution ont été effectués chaque mois et analysés par rapport à environ 160 paramètres dans les catégories suivantes : bactériologique, inorganique et physique (analyses en laboratoire et sur place, présence de métaux) et organique (composés aromatiques chlorés, chlorophénols, pesticides et BPC, dérivés phénoliques, hydrocarbures aromatiques polynucléaires, pesticides particuliers et composés volatils). Les chlorophénols et les pesticides particuliers n'ont été analysés qu'en juin et en novembre.

Le tableau 1 résume les résultats obtenus.

Des coliformes fécaux étaient présents dans le spécimen prélevé en octobre au site n° 2 du réseau de distribution. L'agent de district en a été avisé. En raison de la fréquence des prélèvements (un par mois), le PSEP ne permet pas d'évaluer tous les aspects de la qualité bactériologique de l'eau. Cependant, comme on le recommande dans le cadre des objectifs relatifs à la qualité de l'eau potable en Ontario, un contrôle bactériologique est effectué par l'exploitant. L'analyse bactériologique limitée du PSEP a révélé une eau de bonne qualité.

Les mesures des paramètres inorganiques et physiques étaient inférieures aux limites applicables fixées par l'Ontario pour l'eau potable, sauf une fois, où la turbidité de l'eau traitée ne respectait pas la norme. L'agent de district en a été avisé.

Pour environ 110 paramètres organiques mesurés chaque mois, aucun résultat n'a dépassé les limites acceptables fixées pour la santé.

Un grand nombre de substances détectées apparaissent naturellement ou sont des produits dérivés de l'épuration.

Les résultats des analyses effectuées en 1987 dans le cadre du PSEP ont indiqué que la station d'épuration d'Ottawa (île Lemieux) donnait une eau de bonne qualité et que cette qualité se maintenait dans tout le réseau de distribution.

TABLE 1

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT

## SUMMARY TABLE BY SCAN (1987)

SCAN	RAW			TREATED			SITE 1			SITE 2		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	45	45	100	48	10	20	48	15	31	48	19	39
CHEMISTRY (FLD)	38	38	100	72	72	100	136	136	100	138	138	100
CHEMISTRY (LAB)	225	200	88	225	187	83	393	359	91	393	347	88
METALS	243	122	50	243	119	48	471	243	51	469	220	46
CHLOROAROMATICS	117	0	0	143	0	0	156	1	0	156	1	0
CHLOROPHENOLS	12	0	0	12	1	8	.	.	.	.	.	.
PAH	68	0	0	68	0	0	.	.	.	.	.	.
PESTICIDES & PCB	231	0	0	275	0	0	297	0	0	297	0	0
PHENOLICS	12	1	8	12	1	8	.	.	.	.	.	.
SPECIFIC PESTICIDES	162	0	0	162	0	0	108	0	0	108	0	0
VOLATILES	337	5	1	336	38	11	337	39	11	337	36	10
TOTAL	1490	411		1596	428		1946	793		1946	761	

FECAL COLIFORMS WERE PRESENT IN ONE DISTRIBUTED WATER, THE ODWO FOR TURBIDITY WAS EXCEEDED IN ONE TREATED WATER

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE  
 A ' .' INDICATES THAT NO SAMPLE WAS TAKEN

DRINKING WATER SURVEILLANCE PROGRAM

OTTAWA (LEMIEUX ISLAND) WATER TREATMENT PLANT  
1987 ANNUAL REPORT

INTRODUCTION

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored. Appendix A contains a detailed description of the DWSP.

The DWSP was initiated at the Ottawa (Lemieux Island) Water Treatment Plant in the fall of 1986. An annual report was published for 1986 (ISBN 0-7729-2561-5).

This report contains information and results for 1987.

PLANT DESCRIPTION

The Ottawa (Lemieux Island) Water Treatment is a conventional treatment plant which treats water from the Ottawa River. The process consists of coagulation, flocculation, sedimentation, filtration, disinfection, post pH adjustment and fluoridation. This plant, in conjunction with the Britannia Water Treatment Plant, serves a population of approximately 515,000 people. It

has a design capacity of 299.0 x 1000m<sup>3</sup>/day and daily flows ranging from 54.32 x 1000m<sup>3</sup>/day to 203 x 1000m<sup>3</sup>/day.

The plant location is shown in Figure 1. Plant process details, in a block schematic, are shown in Figure 2. General plant information is presented in Table 2.

#### METHODS

Water samples were obtained from four DWSP approved locations;

- i) Plant Raw - The water originated from the intake basin prior to chlorination and was sampled through a stainless steel line. The sample tap is located in the plant laboratory.
- ii) Plant Treated - The water originated from the highlift discharge after addition of all treatment chemicals and was sampled through a copper sample line. The sample tap is located in the plant laboratory.
- iii) Distribution System - Site 1 - This house is approximately 4 kilometers from the plant. Water was sampled through copper plumbing, from the basement laundry tap.
- iv) Distribution System - Site 2 - This house is approximately 30 kilometers from the plant. Water was sampled through copper plumbing, from the basement laundry tap.

FIGURE 1

DRINKING WATER SURVEILLANCE PROGRAM ANNUAL REPORT

SITE LOCATION MAP

LOCATION: OTTAWA (LEMIEUX & BRITTANNIA) WATER TREATMENT PLANT



FIGURE 2  
OTTAWA (LEMIEUX ISLAND) WATER TREATMENT PLANT

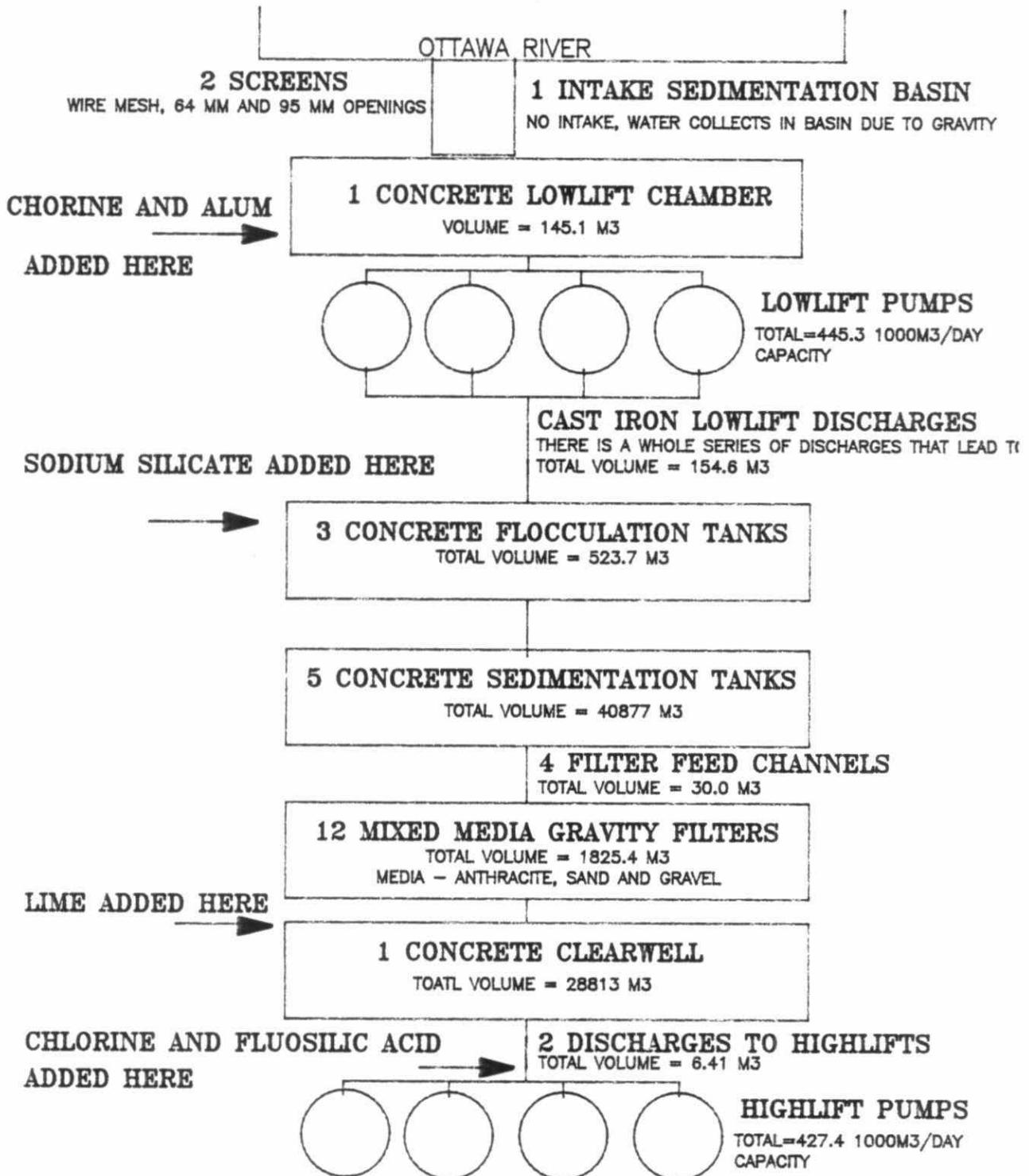


TABLE 2

DRINKING WATER SURVEILLANCE PROGRAM ANNUAL REPORT

GENERAL INFORMATION

OTTAWA (LEMIEUX ISLAND) WATER TREATMENT PLANT

LOCATION: BAYVIEW ROAD, LEMIEUX ISLAND  
OTTAWA, ONTARIO  
(613-728-3771)

SOURCE: RAW WATER SOURCE - OTTAWA RIVER

RATED CAPACITY: 298.7 (1000 M<sup>3</sup>/DAY)

OPERATION: MUNICIPAL

PLANT SUPERINTENDENT: L. SCHARFE

MINISTRY REGION: SOUTHEASTERN

DISTRICT OFFICER: MR. R.A. DUNN

<u>MUNICIPALITY SERVED</u>	<u>POPULATION</u>
CITY OF OTTAWA	304,000
GLOUCESTER	76,589
VANIER	18,877
ROCKCLIFFE	2,267
GOULBOURN	9,720
CUMBERLAND	17,008
OSGOODE	9,561

Sample lines in the plant were flushed prior to sampling to ensure that the water obtained was indicative of its origin and not residual water standing in the sample line.

At all distribution system locations two types of samples were obtained: a standing and a free flow. The standing sample consisted of water that had been in the household plumbing and service connection for a minimum of six hours. These samples are used to make an assessment of the amount by which the levels of inorganic compounds and metals may be changed on standing, due to leaching from (or deposition on), the plumbing system. The only analysis carried out on these samples therefore, are General Chemistry and Metals. The free flow sample represented fresh water from the distribution main that had been flowing for five minutes before being sampled.

Attempts were made to capture the same block of water at each sampling point by taking the retention time into consideration. The retention time was calculated by dividing the volume of water between the two sampling points by the sample day flow. For example, if it was determined that the retention time within the plant was five hours then there would be a five hour interval between the raw and treated sampling. Similarly, if it was estimated that it took approximately one day for the water to travel from the plant to the distribution system site, this site would be sampled one day after the treated water from the plant.

Stringent DWSP sampling protocols were followed to eliminate any variance (Appendix B).

Sample day flow, treatment chemical dosages and field measurements such as Turbidity, Chlorine Residuals, pH and Temperature were recorded on the day of sampling and were entered onto the DWSP data base as submitted.

#### RESULTS

The Ottawa (Lemieux Island) Water Treatment Plant was sampled for approximately 160 parameters on a monthly basis.

The Specific Pesticides and Chlorophenol scans were sampled for in June and November only. Polynuclear Aromatic Hydrocarbons and Phenolics are only analysed for in the raw and treated water at the plant.

Table 3 contains information on the sample day retention time, flow rate and treatment chemicals used and their associated dosages.

Table 4 is a summary break-down of the number of water samples analysed for by parameter and by water type. The number of times that a positive or trace result was detected is also reported.

Positive denotes that the result is greater than the statistical limit of detection established by the Ministry of the Environment

(MOE) laboratory staff and is quantifiable. Trace (<T) denotes that the level measured is greater than the lowest value detectable by the method but lies so close to the detection limit that it cannot be confidently quantified.

Table 5 presents the results for parameters detected on at least one occasion.

Table 6 presents parameters not detected.

Associated guidelines and detection limits are also supplied on both tables. Parameters are listed alphabetically within each scan.

#### DISCUSSION

##### General

Water quality is judged by comparison with the Ontario Drinking Water Objectives (ODWOS) as defined in the 1984 publication (ISBN 0-7743-8985-0). The Province of Ontario has health related and aesthetic objectives for 49 parameters, these are currently under review. When an ODWO is not available guidelines/limits from other agencies are consulted. The Parameters Listing System (PALIS) recently initiated by the MOE catalogues and keeps current over 1750 guidelines for 650 parameters from agencies throughout the world.

As stated under Results, traces do not indicate quantifiable

results as defined by established MOE laboratory analytical reporting protocols. While they can be useful in trend analysis or confirmation of the presence of a specific contaminant that is repeatedly detected at these levels, the occasional finding of a trace level of a contaminant is not considered to be significant. DISCUSSION OF GUIDELINES AND LIMITS THEREFORE, IS ONLY CONDUCTED ON POSITIVE RESULTS.

#### Bacteriology

Positive results for the Bacteriology scan were present ten times in the treated water, fifteen times in the distribution system Site 1 water and nineteen times in the Site 2 water. In most cases the positive parameters were Standard Plate Count, Total Coliform and/or Total Coliform Background.

Fecal Coliforms, E. Coli and Coliform Bacteria were recovered in the Presence/Absence test and Coliform Bacteria were detected by the membrane filtration test in the October distribution system Site 2 water. Coliform Bacteria were detected by the membrane filtration test in the September Site 1 water. The District Officer was notified on both occasions.

Standard Plate Count is a test used to supplement routine analysis for Coliform bacteria. The limit for Standard Plate Count (at 35°C after 48 hours) in the ODWOS is 500 organisms per mL (based on a geometric mean of 5 or more samples). High

Standard Plate Counts were present in the June distribution system Site 1 and Site 2 waters. While no indicators of unsafe water were detected at this time, the high Standard Plate Count may be indicative of a deterioration in conditions in the distribution system. A total Chlorine Residual of at least 0.05 mg/L was detected at both sample locations in the distribution system however, water temperature became elevated during the summer months. The high Standard Plate Counts obtained for the month of June may reflect increased bacteriological growth as a result of the increased temperature. No other samples contained bacteriological results over any applicable health related ODWOS.

Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water. Routine bacteriological monitoring as recommended in the ODWOS is carried out by the operating authority. Water from the Ottawa (Lemieux Island) Water Treatment Plant, in terms of the limited DWSP bacteriological examination, was of good quality.

#### Inorganic and Physical Parameters

##### **Laboratory and Field Chemistry**

The results for the Laboratory Chemistry and Field Chemistry scans were below any applicable health related ODWOS with one exception.

The February treated water sample Laboratory Turbidity value was

above the ODWO of 1 FTU at 2.8 FTU. Although this could be a transcription error the District Officer was notified. The Field Turbidity value for this sample was .47 FTU. The reasons for discrepancies between Field and Laboratory Turbidity determinations, which have also been observed at other DWSP locations, are being investigated. No other samples contained Turbidity values above the ODWO.

Turbidity in water is caused by the presence of suspended matter such as clay, silt, colloidal particles, plankton and other microscopic organisms. The most important potential health effect of Turbidity is its interference with disinfection in the treatment plant and maintenance of a chlorine residual. The ODWO of 1 Formazin Turbidity Unit (FTU) is only applicable to treated water leaving the plant.

There are ODWOS that are set for parameters which are related to aesthetic quality rather than health. One of these is Organic Nitrogen. Organic Nitrogen is calculated by subtracting the Ammonia (Ammonium Total) value from the Total Kjeldahl Nitrogen (Nitrogen Tot Kjeld). In a number of treated water samples and distribution system samples Organic Nitrogen values exceeded the aesthetic ODWO of 0.15 mg/L. When Organic Nitrogen exceeds 0.15 mg/l in treated water some taste and odour problems can result.

This guideline is exceeded in most supplies. Based on the information obtained from the DWSP, which generally indicates no problems with this parameter exceedence, the guideline may be

modified when the ODWOS are reviewed.

It is desirable that the Temperature of drinking water be less than 15°C; the palatability of water is enhanced by its coolness. A temperature below 15°C will tend to reduce the growth of nuisance organisms and hence minimize associated taste, colour, odour and corrosion problems. The desired ODWO was exceeded during the summer months in treated and distributed water.

As part of the treatment process, Fluosilic Acid is added to the treated water (Table 3). Where fluoridation is practiced, the fluoride concentration recommended in the ODWOS is 1.2 mg/L, plus or minus 0.2 mg/L. Maintenance of this level was not achieved in the treated or distribution system water as indicated by the Fluoride levels which are below 1.0 mg/L in most cases.

Calcium, Conductivity, Hardness and pH levels increased in the treated water as compared to the raw water. These increases are a result of the addition of Calcium Carbonate, in the form of lime, during the treatment process to adjust the final pH in the treated water.

#### **Metals**

The results reported for the Metals scan were below any applicable health related ODWOS.

Copper, Iron and Maganese levels were lower in the treated water as compared to the raw water. This is a result of the treatment

process. The addition of Alum as a coagulant to the raw water and the resulting coagulation/settling process has been shown to reduce the levels of most metals.

Elevated levels of Copper and Zinc were detected in most standing samples as compared to the free flow distribution samples thus, indicating that small quantities of these metals were leached from the household plumbing as the water stood overnight.

The Lead levels for the Site 1 standing samples are all elevated. A lead service connection is present at this location, small quantities of lead were leached as the water stood overnight.

Mercury levels were increasing through the year. Over the past year in the DWSP it has been observed that potassium dichromate, used to preserve Mercury samples, has a limited shelf-life and may show false positives for the presence of Mercury. As the preservative deteriorates, Mercury levels increased due to interferences and the preservatives are replaced.

At present, there is no evidence that Aluminum is physiologically harmful and no health limit has been specified. The measure of residual Aluminum in the treated water is important to indicate efficiency of the treatment process. The ODWOs indicate that a useful guideline is to maintain a residual below 0.1 mg/L as Al in the water leaving the plant to avoid post precipitation problems. Aluminum values exceeded the ODWO operational guideline on seven occasions.

## Organic Parameters

### **Chloroaromatics**

The results of the Chloroaromatics scan showed that four parameters were detected:

1,2,3,5-Tetrachlorobenzene

1,2,4,5-Tetrachlorobenzene

Hexachloroethane

2,3,6-Trichlorotoluene

1,2,3,5-Tetrachlorobenzene was detected at a trace level, once in the distribution system Site 2 water.

1,2,4,5-Tetrachlorobenzene was detected at trace levels, twice in the treated and once in the distribution system Site 2 water.

Hexachloroethane was detected at trace levels, once in the raw water, five times in the treated water, five times in the distribution system Site 1 water and twice in the Site 2 water. Two positive results, 14.00 ng/L in the distribution system Site 1 May sample and 16.00 ng/L in the Site 2 March sample were detected. Both of these results were below the United States Environmental Protection Agency's Ambient Water Quality (AWQ) guideline of 1,900 ng/L. AWQ guidelines are designed to ensure that surface water, used as a drinking water source and from which fish are consumed, does not contain substances at levels that would be hazardous to human health. Since both water and

fish consumption are considered, AWQ guidelines are usually more stringent than any corresponding drinking water guideline.

2,3,6-Trichlorotoluene was detected at a trace level, once in the treated water.

Review of these results, along with information from other water supplies on DWSP, would indicate that certain Chloroaromatics appear more frequently in the treated water than in the raw and almost always only at trace levels. These occurrences could possibly be due to a reaction of chlorine with organics present in the water or in the distribution system.

#### **chlorophenols**

The results of the Chlorophenols scan showed that no Chlorophenols were detected.

#### **Pesticides and PCB (Polychlorinated Biphenyl)**

The results of the Pesticides and PCB scan showed that two pesticides were detected:

Alpha BHC

Lindane

Lindane consist of several isomers of BHC (Benzene Hexachloride). Alpha BHC is the isomer predominantly found in water from the Great Lakes Basin as indicated in results from other water supplies on DWSP.

Alpha BHC was detected at trace levels, five times in the raw water, eight times in the treated water and nine times in the distribution system Site 1 and Site 2 water.

Lindane was detected at trace levels, twice in the treated water and twice in the distribution system Site 1 and site 2 waters.

#### **Specific Pesticides**

Results of the Specific Pesticides scan showed that no parameters were detected.

#### **Phenolics**

Phenols were detected at trace levels, nine times in the raw water and eight times in the treated water. One positive result for the April raw water at 1.2 ug/L was a result of using an improper cap as indicated by the remark code 'CIC'. Phenolics compounds are present in the aquatic environment as a result of natural and/or industrial processes.

#### **Polynuclear Aromatic Hydrocarbons (PAH)**

The results of the PAH scan showed that no PAHs were detected.

#### **Volatiles**

The results of the Volatiles scan showed that five parameters, other than Trihalomethanes(THMs), were detected:

Toluene

Ethylbenzene

Para and Meta-Xylene

Ortho-Xylene

1,4 Dichlorobenzene

Toluene was detected at 0.7 ug/L in the November treated water. This is below the California State Department of Health Guideline Level for drinking water of 100 ug/L. Subsequent to producing Table 5, Health and Welfare Canada have published an Aesthetic Objective (AO) for Toluene in drinking water of 24 ug/L. AOs are set at values that are below those that could be derived based on health considerations. Toluene was also detected at a trace level, in the distribution system Site 1 water for the same month. A positive result in the December sample from distribution system Site 1 was considered unreliable by the Laboratory due to contamination as indicated by the remark code 'UCS'.

Ethylbenzene was detected at trace levels, four times in the treated water, once in the distribution system Site 1 water and twice in the Site 2 water.

Para and Meta-Xylene are measured as one compound, M-Xylene and were detected at a trace level, once in the distribution system Site 1 water.

Ortho-Xylene (O-Xylene) was detected once at a trace level, in the distribution system Site 1 water.

These volatiles are typically found on an occasional basis at other water supplies included on the DWSP usually at trace levels.

1,4-Dichlorobenzene was detected at trace levels, twice in the treated water.

THMs are acknowledged to be produced during the water treatment process and will always occur in chlorinated surface waters. THMs are comprised mainly of Chloroform, Chlorodibromomethane and Dichlorobromomethane. Bromoform occurs occasionally. Results are reported for the individual compounds as well as for total THMs.

Chloroform, Dichlorobromomethane and Total THMs were detected in all treated waters. Chlorodibromomethane was detected once in the treated water and once in the distribution system Site 2 water. All THM occurrences were well below the ODWO of 350 ug/l for Total THMs.

THMs were present in three of the raw water samples indicating that low levels of chlorine were present.

#### CONCLUSIONS

The Ottawa (Lemieux Island) Water Treatment plant for the sample year of 1987 produced good quality water at the plant and this

was maintained throughout the distribution system.

No health related guidelines, for organic or inorganic parameters, were exceeded during 1987. The ODWO for Turbidity, a physical parameter, as measured in the laboratory, was exceeded on one occasion.

#### RECOMMENDATIONS

Three recommendations can be made and are as follows:

- 1) The data base should be reviewed in consultation with Regional, Plant and DWSP personnel to determine if sampling location, sampling frequency and the number of parameters analysed could be revised to allow for a more efficient characterization of the water.
- 2) During 1987 three raw water samples contained THMs. This sample site should be reassessed to ensure that it still meets the DWSP sampling protocol.
- 3) Fluoride dosages should be adjusted to maintain the recommended level of fluoride in distributed water.

TABLE 3

DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT

1987

SAMPLE DAY CONDITIONS			TREATMENT CHEMICAL DOSAGES (MG/L)													
TE	RETENTION TIME(HRS)	FLOW (1000 M3)	PRE-CHLORINATION		COAGULATION		ACTIVATION		COAGULATION AID		POST PH ADJUSTMENT		FLUORIDATION		POST-CHLORINATION	
			CHLORINE	ALUM LIQUID	ALUM LIQUID	ALUM LIQUID	SODIUM SILICATE	CALCIUM CARBONATE	FLUOSILIC ACID	CHLORINE						
4 26	4.5	260.0	1.00	32.00		1.50		2.50		8.60		1.00		1.40		
3 23	5.5	180.0	.80	30.00		1.00		1.50		8.60		1.00		1.40		
3 23	5.9	196.1	1.00	3.20		1.00		2.00		14.00		1.00		1.40		
R 27	4.8	238.3	1.20	34.00		1.00		1.75		14.00		.90		1.40		
Y 25	4.2	208.4	1.60	36.00		.50		.75		14.00		.90		1.40		
H 22	5.6	280.5	2.00	34.00		.50		1.00		12.00		.90		1.40		
L 27	2.4	222.2	2.40	34.00		1.00		.75		14.00		.92		1.60		
G 24	2.2	246.7	2.20	28.00		1.50		.75		14.00		.90		1.60		
P 28	2.0	223.1	2.20	28.00		1.50		.75		14.00		.90		1.60		
T 28	2.7	163.7	2.00	28.00		.50		1.00		14.00		.90		1.60		
V 25	1.8	242.8	2.00	28.00		2.00		2.00		14.00		.90		1.60		
C 16	1.9	230.6	1.80	36.00		2.00		2.00		14.00		.90		1.60		

TABLE 4

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT

## SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	RAW WATER			TREATED WATER			SITE 1			SITE 2		
		# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE
BACTERIOLOGICAL	AEROMONAS SP	0	0	0	0	0	0	0	0	0	1	0	0
	COLIFORM	0	0	0	0	0	0	0	0	0	1	1	0
	ESCHERICHIA COLI BY PRESENCE/ABSENCE	0	0	0	0	0	0	0	0	0	1	1	0
	FECAL COLIFORM	0	0	0	0	0	0	0	0	0	1	1	0
	FECAL COLIFORM MEMBRANE FILTRATION	12	12	0	0	0	0	0	0	0	0	0	0
	P/A BOTTLE	0	0	0	12	0	0	12	0	0	11	1	0
	STANDARD PLATE COUNT MEMBRANE FILT.	11	11	0	12	7	0	12	11	0	10	10	0
	STAPH AUREUS	0	0	0	0	0	0	0	0	0	1	0	0
	TOTAL COLIFORM BACKGROUND MF	11	11	0	12	3	0	12	3	0	11	4	0
	TOTAL COLIFORM MEMBRANE FILTRATION	11	11	0	12	0	0	12	1	0	11	1	0
*TOTAL SCAN BACTERIOLOGICAL		45	45	0	48	10	0	48	15	0	48	19	0
*TOTAL GROUP BACTERIOLOGICAL		45	45	0	48	10	0	48	15	0	48	19	0
CHEMISTRY (FLD)	FIELD COMBINED CHLORINE RESIDUAL	1	1	0	12	12	0	22	22	0	23	23	0
	FIELD FREE CHLORINE RESIDUAL	1	1	0	12	12	0	19	19	0	19	19	0
	FIELD PH	12	12	0	12	12	0	24	24	0	24	24	0
	FIELD TEMPERATURE	12	12	0	12	12	0	24	24	0	24	24	0
	FIELD TOTAL CHLORINE RESIDUAL	1	1	0	12	12	0	23	23	0	24	24	0
	FIELD TURBIDITY	11	11	0	12	12	0	24	24	0	24	24	0
*TOTAL SCAN CHEMISTRY (FLD)		38	38	0	72	72	0	136	136	0	138	138	0
CHEMISTRY (LAB)	ALKALINITY	12	12	0	12	12	0	24	24	0	24	24	0
	AMMONIUM TOTAL	12	11	0	12	6	5	24	20	3	24	14	8

TABLE 4

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT

## SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	RAW WATER			TREATED WATER			SITE 1			SITE 2		
		# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE
CHEMISTRY (LAB)	CALCIUM	12	12	0	12	12	0	24	24	0	24	24	0
	CHLORIDE	12	9	3	12	12	0	24	24	0	24	24	0
	COLOUR	12	12	0	12	10	2	24	23	1	24	24	0
	CONDUCTIVITY	12	12	0	12	12	0	24	24	0	24	24	0
	CYANIDE	9	0	0	9	0	0	9	0	0	9	0	0
	FLUORIDE	12	8	4	12	12	0	24	24	0	24	24	0
	HARDNESS	12	12	0	12	12	0	24	24	0	24	24	0
	MAGNESIUM	12	12	0	12	12	0	24	24	0	24	24	0
	NITRITE	12	10	2	12	1	11	24	4	19	24	2	19
	NITROGEN TOTAL KJELDAHL	12	12	0	12	11	1	24	24	0	24	19	5
	PH	12	12	0	12	12	0	24	24	0	24	24	0
	PHOSPHORUS FIL REACT	12	12	0	12	11	1	0	0	0	0	0	0
	PHOSPHORUS TOTAL	12	7	5	12	5	7	0	0	0	0	0	0
	SODIUM	12	12	0	12	12	0	24	24	0	24	24	0
	TOTAL NITRATES	12	11	1	12	11	1	24	24	0	24	24	0
	TOTAL SOLIDS	12	12	0	12	12	0	24	24	0	24	24	0
	TURBIDITY	12	12	0	12	12	0	24	24	0	24	24	0
*TOTAL SCAN CHEMISTRY (LAB)		225	200	15	225	187	28	393	359	23	393	347	32
METALS	ALUMINUM	12	12	0	12	12	0	24	24	0	24	24	0
	ARSENIC	12	0	0	12	0	0	24	0	0	24	0	0
	BARIUM	12	12	0	12	12	0	24	24	0	24	24	0
	BERYLLIUM	12	0	0	12	0	0	24	0	0	24	0	0
	BORON	12	0	1	12	1	1	24	2	3	22	2	4
	CADMUM	12	0	0	12	0	0	24	1	0	24	0	0

TABLE 4

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT

## SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	RAW WATER			TREATED WATER			SITE 1			SITE 2		
		# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE
METALS	CHROMIUM	12	7	0	12	3	0	24	9	0	24	1	0
	COBALT	12	2	0	12	3	0	24	1	0	24	3	0
	COPPER	12	12	0	12	12	0	24	24	0	24	24	0
	CYANIDE	3	0	0	3	0	0	3	0	0	3	0	0
	IRON	12	12	0	12	11	0	24	24	0	24	24	0
	LEAD	12	1	0	12	1	0	24	21	0	24	5	0
	MANGANESE	12	12	0	12	12	0	24	24	0	24	24	0
	MERCURY	12	11	0	12	11	0	12	9	0	12	9	0
	MOLYBDENUM	12	0	0	12	0	0	24	0	0	24	3	0
	NICKEL	12	4	0	12	4	0	24	7	0	24	6	0
	SELENIUM	12	0	0	12	0	0	24	0	0	24	0	0
	STRONTIUM	12	12	0	12	12	0	24	24	0	24	24	0
	URANIUM	12	9	0	12	6	0	24	12	0	24	10	0
	VANADIUM	12	5	0	12	9	0	24	14	0	24	15	0
	ZINC	12	11	0	12	10	0	24	23	0	24	22	0
*TOTAL SCAN METALS		243	122	1	243	119	1	471	243	3	469	220	4
*TOTAL GROUP INORGANIC & PHYSICAL		506	360	16	540	378	29	1000	738	26	1000	705	36
CHLOROAROMATICS	123 TRICHLOROBENZENE	9	0	0	11	0	0	12	0	0	12	0	0
	1234 TETRACHLOROBENZENE	9	0	0	11	0	0	12	0	0	12	0	0
	1235 TETRACHLOROBENZENE	9	0	0	11	0	0	12	0	0	12	0	1
	124 TRICHLOROBENZENE	9	0	0	11	0	0	12	0	0	12	0	0
	1245 TETRACHLOROBENZENE	9	0	0	11	0	2	12	0	0	12	0	1
	135 TRICHLOROBENZENE	9	0	0	11	0	0	12	0	0	12	0	0
	236 TRICHLOROTOLUENE	9	0	0	11	0	1	12	0	0	12	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT

### SUMMARY TABLE OF RESULTS (1987)

TABLE 4  
DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	RAW WATER			TREATED WATER			SITE 1			SITE 2			
		# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	
PAH	BENZO(G,H,I) PERYLENE	4	0	0	4	0	0	0	0	0	0	0	0	
	BENZO(J) FLUORANTHENE	0	0	0	0	0	0	0	0	0	0	0	0	
	BENZO(K) FLUORANTHENE	4	0	0	4	0	0	0	0	0	0	0	0	
	CHRYSENE	4	0	0	4	0	0	0	0	0	0	0	0	
	CORONENE	4	0	0	4	0	0	0	0	0	0	0	0	
	DIBENZO(A,H) ANTHRACENE	4	0	0	4	0	0	0	0	0	0	0	0	
	DIMETHYL BENZO(A) ANTHRACENE	4	0	0	4	0	0	0	0	0	0	0	0	
	FLUORANTHENE	4	0	0	4	0	0	0	0	0	0	0	0	
	INDENO(1,2,3-C,D) PYRENE	4	0	0	4	0	0	0	0	0	0	0	0	
	PERYLENE	4	0	0	4	0	0	0	0	0	0	0	0	
	PHENANTHRENE	4	0	0	4	0	0	0	0	0	0	0	0	
	PYRENE	4	0	0	4	0	0	0	0	0	0	0	0	
*TOTAL SCAN PAH		68	0	0	68	0	0	0	0	0	0	0	0	
<hr/>														
PESTICIDES & PCB		ALACHLOR	12	0	0	12	0	0	12	0	0	12	0	0
		ALDRIN	9	0	0	11	0	0	12	0	0	12	0	0
		ALPHA BHC	9	0	5	11	0	8	12	0	9	12	0	9
		ALPHA CHLORDANE	9	0	0	11	0	0	12	0	0	12	0	0
		ATRATONE	12	0	0	12	0	0	12	0	0	12	0	0
		BETA BHC	9	0	0	11	0	0	12	0	0	12	0	0
		DICHLORODIPHENYLDICHLOROETHANE	9	0	0	11	0	0	12	0	0	12	0	0
		DIELDRIN	9	0	0	11	0	0	12	0	0	12	0	0
		ENDRIN	9	0	0	11	0	0	12	0	0	12	0	0
		ETHLYENE DIBROMIDE	9	0	0	9	0	0	9	0	0	9	0	0
		GAMMA CHLORDANE	9	0	0	11	0	0	12	0	0	12	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT

### SUMMARY TABLE OF RESULTS (1987)

TABLE 4

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT

## SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	RAW WATER			TREATED WATER			SITE 1			SITE 2		
		# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE
SPECIFIC PESTICIDES	24-DICHLOROPHENYOXYBUTYRIC	2	0	0	2	0	0	0	0	0	0	0	0
	AMETRYNE	12	0	0	12	0	0	12	0	0	12	0	0
	AMINOCARB	0	0	0	0	0	0	0	0	0	0	0	0
	ATRAZINE	12	0	0	12	0	0	12	0	0	12	0	0
	BENOMYL	0	0	0	0	0	0	0	0	0	0	0	0
	BLADEX	12	0	0	12	0	0	12	0	0	12	0	0
	BUX (METALKAMATE)	2	0	0	2	0	0	0	0	0	0	0	0
	CARBOFURAN	2	0	0	2	0	0	0	0	0	0	0	0
	DIALLATE	2	0	0	2	0	0	0	0	0	0	0	0
	DIAZINON	2	0	0	2	0	0	0	0	0	0	0	0
	DICAMBA	2	0	0	2	0	0	0	0	0	0	0	0
	DICHLOROVOS	2	0	0	2	0	0	0	0	0	0	0	0
	DURSBAN	2	0	0	2	0	0	0	0	0	0	0	0
	EPTAM	2	0	0	2	0	0	0	0	0	0	0	0
	ETHION	2	0	0	2	0	0	0	0	0	0	0	0
	GUTHION	0	0	0	0	0	0	0	0	0	0	0	0
	IPC	2	0	0	2	0	0	0	0	0	0	0	0
	MALATHION	2	0	0	2	0	0	0	0	0	0	0	0
	METHYL PARATHION	2	0	0	2	0	0	0	0	0	0	0	0
	METHYLTRITHION	2	0	0	2	0	0	0	0	0	0	0	0
	METOLACHLOR	12	0	0	12	0	0	12	0	0	12	0	0
	MEVINPHOS	2	0	0	2	0	0	0	0	0	0	0	0
	PARATHION	2	0	0	2	0	0	0	0	0	0	0	0
	PHORATE (THIMET)	2	0	0	2	0	0	0	0	0	0	0	0
	PICHLORAM	0	0	0	0	0	0	0	0	0	0	0	0
	PROMETONE	12	0	0	12	0	0	12	0	0	12	0	0
	PROMETRYNE	12	0	0	12	0	0	12	0	0	12	0	0

TABLE 4

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT

## SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	RAW WATER			TREATED WATER			SITE 1			SITE 2		
		# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE
SPECIFIC PESTICIDES	PROPAZINE	12	0	0	12	0	0	12	0	0	12	0	0
	PROPOXUR	2	0	0	2	0	0	0	0	0	0	0	0
	RELDAN	2	0	0	2	0	0	0	0	0	0	0	0
	RONNEL	2	0	0	2	0	0	0	0	0	0	0	0
	SENCOR	12	0	0	12	0	0	12	0	0	12	0	0
	SEVIN (CARBARYL)	2	0	0	2	0	0	0	0	0	0	0	0
	SILVEX	2	0	0	2	0	0	0	0	0	0	0	0
	SIMAZINE	12	0	0	12	0	0	12	0	0	12	0	0
	SUTAN (BUTYLATE)	2	0	0	2	0	0	0	0	0	0	0	0
	TOXAPHENE	0	0	0	0	0	0	0	0	0	0	0	0
*TOTAL SCAN SPECIFIC PESTICIDES		162	0	0	162	0	0	108	0	0	108	0	0
VOLATILES	1,1 DICHLOROETHANE	12	0	0	12	0	0	12	0	0	12	0	0
	1,1 DICHLOROETHYLENE	12	0	0	12	0	0	12	0	0	12	0	0
	1,2 DICHLOROBENZENE	12	0	0	12	0	0	12	0	0	12	0	0
	1,2 DICHLOROETHANE	12	0	0	12	0	0	12	0	0	12	0	0
	1,2 DICHLOROPROPANE	12	0	0	12	0	0	12	0	0	12	0	0
	1,3 DICHLOROBENZENE	12	0	0	12	0	0	12	0	0	12	0	0
	1,4 DICHLOROBENZENE	12	0	0	12	0	2	12	0	0	12	0	0
	111, TRICHLOROETHANE	12	0	0	12	0	0	12	0	0	12	0	0
	112 TRICHLOROETHANE	12	0	0	12	0	0	12	0	0	12	0	0
	1122 TETRA-CHLOROETHANE	12	0	0	12	0	0	12	0	0	12	0	0
	BENZENE	12	0	0	12	0	0	12	0	0	12	0	0
	BROMOFORM	12	0	0	12	0	0	12	0	0	12	0	0
	CARBON TETRACHLORIDE	12	0	0	12	0	0	12	0	0	12	0	0

TABLE 4  
DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	RAW WATER			TREATED WATER			SITE 1			SITE 2		
		# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE
VOLATILES	CHLOROBENZENE	12	0	0	12	0	0	12	0	0	12	0	0
	CHLORODIBROMOMETHANE	12	0	0	12	1	2	12	1	0	12	0	0
	CHLOROFORM	12	1	3	12	12	0	12	12	0	12	12	0
	DICHLOROBROMOMETHANE	12	0	0	12	12	0	12	12	0	12	12	0
	ETHYLENE DIBROMIDE	3	0	0	3	0	0	3	0	0	3	0	0
	ETHYLBENZENE	12	0	0	12	0	4	12	0	1	12	0	2
	M-XYLENE	12	0	0	12	0	0	12	0	1	12	0	0
	METHYLENE CHLORIDE	10	0	0	9	0	0	10	1	0	10	0	0
	O-XYLENE	12	0	0	12	0	0	12	0	1	12	0	0
	P-XYLENE	12	0	0	12	0	0	12	0	0	12	0	0
	TETRACHLOROETHYLENE	12	0	0	12	0	0	12	0	0	12	0	0
	TOLUENE	12	0	0	12	1	0	12	1	1	12	0	0
	TOTAL TRIHALOMETHANES	12	4	0	12	12	0	12	12	0	12	12	0
	TRANS 1,2 DICHLOROETHYLENE	12	0	0	12	0	0	12	0	0	12	0	0
	TRICHLOROETHYLENE	12	0	0	12	0	0	12	0	0	12	0	0
	TRIFLUOROCHLOROTOLUENE	12	0	0	12	0	0	12	0	0	12	0	0
*TOTAL SCAN VOLATILES		337	5	3	336	38	8	337	39	4	337	36	2
*TOTAL GROUP ORGANIC		939	6	18	1007	39	34	898	40	16	898	37	17
TOTAL		1490	411	34	1595	427	63	1946	793	42	1946	761	53

KEY TO TABLES 5 AND 6

A ONTARIO DRINKING WATER OBJECTIVES

1. Maximum Acceptable Concentration (MAC)
- 1+. MAC for Total Trihalomethanes
- 1\*. MAC for Bacteriological Analyses  
Poor water quality is indicated when :
  - total coliform counts  $> 0 < 5$
  - P/A Bottle Test is present after 48 hours
  - Aeromonas organisms are detected in more than 25% of samples in a single submission or in successive submissions from the same sampling site
  - Pseudomonas Aeruginosa, Staphylococcus Aureus and members of the Fecal Streptococcus group should not be detected in any sample
  - Standard Plate Count should not exceed 500 organisms per ml at 35 deg C within 48 hours
2. Interim Maximum Acceptable Concentration (IMAC)
3. Maximum Desirable Concentration (MDC)
4. Aesthetic or Recommended Operational Guideline
  - hardness levels between 80 and 100 mg/L as calcium carbonate are considered to provide an acceptable balance between corrosion and incrustation, water supplies with a hardness  $>200$  mg/L are considered poor and those in excess of 500 mg/L are unacceptable.

B HEALTH & WELFARE CANADA

1. Maximum Acceptable Concentration (MAC)
2. Proposed MAC
3. Interim MAC

C WORLD HEALTH ORGANIZATION

1. Guideline Value (GV)
2. Tentative GV
3. Aesthetic GV

D US ENVIRONMENTAL PROTECTION AGENCY (EPA)

1. Maximum Contaminant Level (MCL)
2. Suggested No-Adverse Effect Level (SNAEL)
3. Lifetime Health Advisory
4. EPA Ambient Water Quality Criteria

F EUROPEAN ECONOMIC COMMUNITY (EEC)

1. Health Related Guideline Level
2. Aesthetic Guideline Level
3. Maximum Admissible Concentration (MADC)

G CALIFORNIA STATE DEPARTMENT OF HEALTH-GUIDELINE VALUE

H USSR MAXIMUM PERMISSIBLE CONCENTRATION

I NEW YORK STATE AMBIENT WATER GUIDELINE

LABORATORY RESULTS, REMARK DESCRIPTIONS

No Sample Taken  
BDL Below Minimum Measurable Amount  
<T Greater Than Detection Limit But Not Confident  
> Results Are Greater Than The Upper Limit  
<=> Approximate Result  
!AW No Data: Analysis Withdrawn  
!CR No Data: Could Not Confirm By Reanalysis  
!CS No Data: Contamination Suspected  
!IL No Data: Sample Incorrectly Labelled  
!IS No Data: Insufficient Sample  
!LA No Data: Laboratory Accident  
!LD No Data: Test Queued After Sample Discarded  
!NA No Data: No Authorization To Perform Reanalysis  
!NP No Data: No Procedure  
!NR No Data: Sample Not Received  
!OP No Data: Obscured Plate  
!PE No Data: Procedural Error - Sample Discarded  
!PH No Data: Sample pH Outside Valid Range  
!RO No Data: See Attached Report (no numeric results)  
!SM No Data: Sample Missing  
!SS No Data: Send Separate Sample Properly Preserved  
!UI No Data: Indeterminant Interference  
A3C Approximate, Total Count Exceeded 300 Colonies  
APL Additional Peak, Large, Not Priority Pollutant  
APS Additional Peak, Less Than, Not Priority Pollutant  
CIC Possible Contamination, Improper Cap  
CRO Calculated Result Only  
PPS Test Performed On Preserved Sample

RMP P and M-Xylene Not Separated  
RRV Rerun Verification  
RVU Reported Value Unusual  
SPS Several Peaks, Small, Not Priority Pollutant  
UAL Unreliable: Sample Age Exceeds Normal Limit  
UCR Unreliable: Could Not Confirm By Reanalysis  
UCS Unreliable: Contamination Suspected  
UIN Unreliable: Indeterminant Interference  
XP Positive After X Number of Hours

TABLE 5

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
RAW	TREATED	SITE 1	SITE 2			
		STANDING	FREE FLOW	STANDING	FREE FLOW	
BACTERIOLOGICAL						
AEROMONAS SP (0=ABSENT )		DET'N LIMIT = N/A		GUIDELINE = 0	(A1)	
OCT	.	.	.	.	.	0
E. COLI (P/A) (0=ABSENT )		DET'N LIMIT = N/A		GUIDELINE =		
OCT	.	.	.	.	.	1
FECAL COLIFORM MF (CT/100ML )		DET'N LIMIT = 0		GUIDELINE = 0	(A1)	
JAN	23	.	.	.	.	.
FEB	17	.	.	.	.	.
MAR	12	.	.	.	.	.
APR	39	.	.	.	.	.
MAY	23	.	.	.	.	.
JUN	21	.	.	.	.	.
JUL	7	.	.	.	.	.
AUG	90	.	.	.	.	.
SEP	77	.	.	.	.	.
OCT	129	.	.	.	.	.
NOV	60	.	.	.	.	.
DEC	59	.	.	.	.	.
FECAL COLIFORM (0=ABSENT )		DET'N LIMIT = N/A		GUIDELINE = 0	(A1)	
OCT	.	.	.	.	.	1
STANDRD PLATE CNT MF (CT/ML )		DET'N LIMIT = 0		GUIDELINE = 500/ML	(A1)	
JAN	980	1	.	0	.	2
FEB	880	0	.	1	.	3
MAR	1900	4	.	5	.	11
APR	340	2	.	2	.	18
MAY	320	0	.	6	.	.
JUN	2400 >	0	.	2400 >	.	2400 >
JUL	2400 >	0	.	7	.	18
AUG	78	3	.	1	.	4
SEP	10P	5	.	7	.	7
OCT	630	1	.	1	.	IAW
NOV	208	0	.	63	.	3
DEC	790	1	.	2	.	1
P/A BOTTLE (0=ABSENT )		DET'N LIMIT = 0		GUIDELINE = 0	(A1*)	
JAN	.	0	.	0	.	0
FEB	.	0	.	0	.	0
MAR	.	0	.	0	.	0

TABLE 5

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

SITE TYPE	WATER TREATMENT PLANT			DISTRIBUTION SYSTEM		
	RAW	TREATED	SITE 1	STANDING	FREE FLOW	SITE 2
APR	.	0	.	0	.	0
MAY	.	0	.	0	.	.
JUN	.	0	.	0	.	0
JUL	.	0	.	0	.	0
AUG	.	0	.	0	.	0
SEP	.	0	.	0	.	0
OCT	.	0	.	0	.	1
NOV	.	0	.	0	.	0
DEC	.	0	.	0	.	0
STAPH AUREUS (0=ABSENT )		DET'N LIMIT = N/A		GUIDELINE = 0 (A1)		
OCT	.	.	.	.	.	0
COLIFORM (0=ABSENT )		DET'N LIMIT = N/A		GUIDELINE = 0 (A1)		
OCT	.	.	.	.	.	1
TOTAL COLIFORM MF (CT/100ML )		DET'N LIMIT = 0		GUIDELINE = 5/100ML(A1)		
JAN	110	0	.	0	.	0
FEB	88 A3C	0	.	0	.	0
MAR	110 A3C	0	.	0	.	0
APR	63 A3C	0	.	0	.	0
MAY	300	0	.	0	.	.
JUN	10P	0	.	0	.	0
JUL	15 A3C	0	.	0	.	0
AUG	500	0	.	0	.	0
SEP	153 A3C	0	.	1	.	0
OCT	400	0	.	0	.	8 A3C
NOV	226 A3C	0	.	0	.	0
DEC	108 A3C	0	.	0	.	0
T COLIFORM BCKGRD MF (CT/100ML )		DET'N LIMIT = 0		GUIDELINE = N/A		
JAN	120	0	.	0	.	0
FEB	14800	0	.	3	.	0
MAR	920	0	.	0	.	0
APR	380	0	.	0	.	0
MAY	21000	0	.	0	.	.
JUN	10P	5	.	2400 >	.	2400 >
JUL	2400 >	2	.	0	.	0
AUG	8000	2	.	2	.	0
SEP	53000	0	.	0	.	1
OCT	7300	0	.	0	.	2400 >
NOV	1800	0	.	0	.	0
DEC	2100	0	.	0	.	1

TABLE 5

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE	RAW	TREATED	SITE 1		SITE 2	
TYPE			STANDING	FREE FLOW	STANDING	FREE FLOW
<b>CHEMISTRY (FLD)</b>						
FLD CHLORINE (COMB) (MG/L )			DET'N LIMIT = N/A		GUIDELINE =	N/A
JAN	.	.100	.050	.050	.100	.100
FEB	.	.400	.050	.050	.100	.100
MAR	.	.100	.050	.050	.050	.100
APR	.	.100	.050	.050	.050	.100
MAY	.	.050	.050	.150	.050	.050
JUN	.	.100	.	.100	.	.100
JUL	.	.200	.100	.050	.100	.100
AUG	.100	.300	.100	.100	.100	.100
SEP	.	.100	.050	.250	.150	.150
OCT	.	.300	.100	.100	.100	.150
NOV	.	.200	.	.200	.100	.100
DEC	.	.100	.050	.100	.100	.100
FLD CHLORINE FREE (MG/L )			DET'N LIMIT = N/A		GUIDELINE =	N/A
JAN	.	1.200	.100	.550	.100	.150
FEB	.	1.000	.100	.200	.100	.150
MAR	.	1.200	.150	.600	.100	.150
APR	.	1.200	.200	.350	.100	.100
MAY	.	1.300	.150	.350	.	.
JUN	.	1.200	.	.	.	.
JUL	.	1.400	.100	.150	.100	.100
AUG	.100	1.300	.100	.600	.100	.100
SEP	.	1.400	.	.350	.	.050
OCT	.	1.400	.	.500	.100	.150
NOV	.	.140	.	.800	.050	.250
DEC	.	1.400	.400	.800	.100	.400
TOTAL CHLORINE (MG/L )			DET'N LIMIT = N/A		GUIDELINE =	N/A
JAN	.	1.380	.150	.600	.100	.250
FEB	.	1.400	.050	.250	.100	.250
MAR	.	1.300	.200	.650	.150	.250
APR	.	1.390	.250	.400	.100	.200
MAY	.	1.350	.200	.500	.050	.050
JUN	.	1.300	.100	.150	.100	.150
JUL	.	1.600	.100	.200	.100	.100
AUG	.100	1.600	.100	.700	.100	.100
SEP	.	1.500	.050	.600	.150	.200
OCT	.	1.700	.100	.700	.200	.300
NOV	.	1.600	.	1.000	.150	.350
DEC	.	1.500	.450	.900	.100	.500
FLD PH (DMSNLESS )			DET'N LIMIT = N/A		GUIDELINE = 6.5-8.5 (A4)	
JAN	7.100	8.700	7.700	7.900	7.600	7.500

TABLE 5

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

SITE TYPE	WATER TREATMENT PLANT			DISTRIBUTION SYSTEM		
	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
FEB	7.100	8.300	7.500	7.900	7.900	8.100
MAR	7.100	7.600	7.700	7.700	7.900	7.900
APR	7.300	7.500	7.400	7.600	7.800	7.900
MAY	7.300	8.100	7.500	7.900	7.600	7.600
JUN	7.400	7.900	7.700	7.900	7.900	7.900
JUL	7.700	8.800	7.900	7.700	8.100	7.900
AUG	7.300	8.000	7.100	7.700	7.800	8.100
SEP	7.300	8.300	7.700	8.100	7.700	7.900
OCT	7.200	8.300	7.500	7.500	7.500	7.500
NOV	7.100	8.000	7.400	7.900	7.300	7.500
DEC	7.100	8.100	7.600	7.600	7.700	7.700
TEMPERATURE (DEG.C)			DET'N LIMIT = N/A		GUIDELINE =	N/A
JAN	3.000	3.000	16.000	2.000	12.000	16.000
FEB	2.000	3.000	20.000	3.000	14.000	3.000
MAR	2.500	2.000	8.000	2.000	19.500	5.000
APR	13.000	12.000	20.000	12.000	16.500	10.000
MAY	16.000	15.000	21.000	14.000	18.000	12.000
JUN	24.000	23.000	25.000	18.000	19.200	16.000
JUL	26.200	25.200	25.000	24.000	20.500	19.500
AUG	22.500	22.000	25.000	22.000	20.500	20.000
SEP	17.000	17.500	23.000	17.800	20.200	18.000
OCT	10.800	13.200	23.000	11.000	15.000	14.000
NOV	4.000	3.000	25.000	6.000	16.000	10.000
DEC	3.500	3.000	21.000	3.500	17.000	8.500
FLD TURBIDITY (FTU)			DET'N LIMIT = N/A		GUIDELINE = 1.0	(A1)
JAN	2.000	.520	.360	.550	.240	.240
FEB	2.400	.470	1.700	.280	.210	.320
MAR	2.400	.340	.240	.250	.170	.170
APR	1.800	.320	.230	.300	.150	.120
MAY	1.600	.500	.240	.500	.130	.120
JUN	.	.680	.150	.250	.280	.180
JUL	.820	.500	.300	.360	.270	.230
AUG	1.200	.300	.280	.310	.220	.170
SEP	1.000	.270	.210	.290	.220	.210
OCT	2.800	.390	.330	.700	.270	.240
NOV	4.000	.280	.210	.280	.170	.170
DEC	1.500	.280	.170	.270	.140	.120

TABLE 5

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE TYPE	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
CHEMISTRY (LAB)						
ALKALINITY (MG/L)	)		DET'N LIMIT = .200		GUIDELINE = 30-500 (A4)	
JAN	28.300	33.500	32.800	32.900	32.400	32.600
FEB	26.300	32.800	31.100	32.000	32.300	32.800
MAR	29.300	30.300	34.400	34.700	34.900	34.300
APR	25.000	33.200	30.500	29.800	29.500	29.700
MAY	25.200	27.600	26.900	27.100	27.200	26.500
JUN	29.400	28.700	30.300	30.800	30.500	30.100
JUL	22.600	28.000	26.200	28.400	25.800	25.200
AUG	20.200	22.200	24.500	23.700	24.500	24.900
SEP	20.700	24.400	24.500	24.300	24.500	24.500
OCT	21.400	24.300	24.700	26.400	24.300	24.300
NOV	21.900	22.700	25.000	24.900	24.900	24.500
DEC	27.300	30.200	30.500	30.800	31.400	31.200
CALCIUM (MG/L)	)		DET'N LIMIT = .100		GUIDELINE = 100. (F2)	
JAN	10.000	20.000	19.300	19.800	19.500	19.400
FEB	9.400	19.900	20.500	20.000	20.100	20.400
MAR	11.500	20.500	22.300	22.700	22.400	20.400
APR	10.100	18.000	18.900	18.700	19.400	18.300
MAY	9.000	19.600	18.800	19.400	19.000	19.000
JUN	10.800	19.400	19.800	19.200	19.400	19.200
JUL	8.200	19.600	18.600	18.000	18.400	17.800
AUG	7.200	15.200	15.600	15.800	15.800	15.800
SEP	10.400	17.600	17.800	17.800	17.600	18.000
OCT	7.400	16.400	19.000	18.600	18.200	18.400
NOV	8.400	15.600	16.800	17.200	17.200	16.200
DEC	9.400	20.200	19.500	20.100	20.500	20.600
CHLORIDE (MG/L)	)		DET'N LIMIT = .200		GUIDELINE = 250.0 (A3)	
JAN	2.000 <T	4.000	4.000	4.500	4.000	4.000
FEB	3.000	4.000	9.500	4.500	4.500	4.500
MAR	3.500	5.500	5.500	5.500	5.500	5.500
APR	2.000 <T	4.000	4.000	4.500	4.000	4.000
MAY	2.000 <T	4.500	4.500	4.500	4.000	4.000
JUN	3.000	5.500	5.500	5.500	6.000	5.500
JUL	3.000	6.500	6.500	6.500	6.500	6.500
AUG	2.500	6.000	6.000	6.000	6.000	6.000
SEP	3.000	6.500	6.500	6.500	6.500	6.500
OCT	3.100	6.100	6.400	6.100	6.100	6.200
NOV	3.100	5.800	5.800	5.800	5.900	6.100
DEC	3.300	5.900	5.700	5.900	6.200	6.200
COLOUR (TCU)	)		DET'N LIMIT = .5		GUIDELINE = 5.0 (A3)	
JAN	34.500	4.000	4.500	4.500	4.000	4.000

TABLE 5

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

SITE TYPE	WATER TREATMENT PLANT			DISTRIBUTION SYSTEM		
	RAW	TREATED	SITE 1	STANDING	FREE FLOW	SITE 2
FEB	36.500	6.500	3.000	5.000	5.000	4.000
MAR	32.000	4.500	5.000	3.000	5.000	4.500
APR	36.000	5.000	4.500	3.000	3.500	4.000
MAY	26.000	4.000	3.000	2.000 <T	3.000	3.000
JUN	31.000	1.000 <T	3.000	3.000	3.000	3.000
JUL	28.000	3.000	3.500	4.000	3.500	3.500
AUG	24.000	2.000 <T	3.000	3.000	3.000	3.000
SEP	26.000	3.000	3.500	4.000	3.000	3.000
OCT	30.500	3.500	3.500	4.500	3.500	3.000
NOV	32.000	3.500	5.000	4.500	4.500	4.000
DEC	31.500	3.000	3.500	3.500	3.500	3.000
CONDUCTIVITY (UMHO/CM )		DET'N LIMIT = 1		GUIDELINE = 400. (F2)		
JAN	86	144	145	144	144	145
FEB	81	140	153	139	140	141
MAR	96	146	154	155	154	153
APR	81	132	137	137	137	137
MAY	82	140	135	135	139	139
JUN	89	142	146	145	145	144
JUL	78	140	141	138	138	137
AUG	71	124	129	124	126	127
SEP	76	128	129	127	127	127
OCT	78	128	137	133	129	129
NOV	80	126	135	132	132	129
DEC	92	150	154	151	154	153
FLUORIDE (MG/L )		DET'N LIMIT = .01		GUIDELINE = 2.400 (A1)		
JAN	.060	.830	.890	.850	.880	.870
FEB	.060	.940	.970	.900	.980	.990
MAR	.070	.900	1.000	1.040	1.020	.980
APR	.060	.750	.790	.770	.820	.820
MAY	.030 <T	.840	.880	.890	.910	.910
JUN	.090	.870	.880	.830	.920	.910
JUL	.070	.940	.960	.950	1.070	1.030
AUG	.050 <T	.920	.920	.920	.920	.920
SEP	.060	.760	.820	.820	.860	.840
OCT	.060	.800	.820	.780	.860	.840
NOV	.040 <T	.740	.760	.740	.780	.780
DEC	.040 <T	.780	.860	.820	.780	.800
HARDNESS (MG/L )		DET'N LIMIT = .500		GUIDELINE = 80-100 (A4)		
JAN	34.500	60.500	58.500	60.000	59.000	58.500
FEB	33.000	60.500	60.500	60.000	59.500	61.000
MAR	38.500	61.000	65.500	67.500	65.500	60.500

TABLE 5

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE TYPE	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
APR	35.500	56.000	58.000	57.500	60.000	56.500
MAY	33.000	59.000	57.000	58.000	58.000	58.000
JUN	37.000	59.000	60.000	59.000	59.000	59.000
JUL	29.000	57.000	54.000	53.000	54.000	52.000
AUG	25.000	46.000	47.000	47.000	47.000	47.000
SEP	36.000	55.000	55.000	55.000	55.000	55.000
OCT	26.000	49.000	57.000	56.000	55.000	55.000
NOV	29.000	48.000	50.000	52.000	52.000	50.000
DEC	33.500	61.000	59.000	60.500	61.500	61.500
MAGNESIUM (MG/L)			DET'N LIMIT = .050		GUIDELINE = 30.	(F2)
JAN	2.400	2.550	2.500	2.550	2.500	2.500
FEB	2.300	2.600	2.300	2.400	2.300	2.400
MAR	2.300	2.400	2.300	2.600	2.300	2.300
APR	2.500	2.600	2.600	2.600	2.800	2.600
MAY	2.400	2.400	2.500	2.400	2.600	2.500
JUN	2.500	2.600	2.600	2.600	2.500	2.700
JUL	2.100	2.000	1.900	1.900	1.900	1.800
AUG	1.700	1.900	1.900	1.900	1.900	1.900
SEP	2.500	2.600	2.500	2.500	2.500	2.500
OCT	1.700	2.100	2.400	2.300	2.200	2.300
NOV	1.900	2.100	2.100	2.200	2.200	2.200
DEC	2.400	2.550	2.500	2.550	2.500	2.450
SODIUM (MG/L)			DET'N LIMIT = .200		GUIDELINE = 200.	(C3)
JAN	2.600	2.900	2.800	3.000	3.200	2.900
FEB	3.200	3.600	3.500	3.600	3.400	3.300
MAR	3.100	3.400	3.900	3.600	3.500	3.600
APR	2.200	2.300	2.500	2.400	2.400	2.200
MAY	3.600	3.400	4.800	4.600	2.600	3.000
JUN	2.800	2.800	2.800	3.600	2.800	2.800
JUL	2.800	2.600	3.000	2.600	2.800	2.600
AUG	2.400	2.800	3.000	3.000	3.000	3.000
SEP	3.600	3.600	3.800	3.800	4.000	3.600
OCT	3.200	3.400	3.400	3.000	3.000	3.000
NOV	3.400	3.800	3.800	3.800	4.000	3.800
DEC	3.000	3.200	3.300	3.400	3.500	3.400
AMMONIUM TOTAL (MG/L)			DET'N LIMIT = 0.002		GUIDELINE = .05	(F2)
JAN	.032	.008 <T	.100	.008 <T	BDL	BDL
FEB	.062	.026	.364	.022	.024	.026
MAR	.062	.014	.014	.016	.010	.010
APR	.026	.004 <T	.052	.006 <T	.004 <T	.014
MAY	.014	.008 <T	.098	.042	.012	.008 <T

TABLE 5

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT			DISTRIBUTION SYSTEM		
SITE	RAW	TREATED	SITE 1	SITE 2		
TYPE			STANDING	FREE FLOW	STANDING	FREE FLOW
JUN	.024	.010	.078	.050	.018	.014
JUL	.026	.004 <T	.182	.030	.006 <T	.006 <T
AUG	BDL	BDL	.128	.012	.008 <T	.004 <T
SEP	.014	.010	.128	.008 <T	.026	.012
OCT	.026	.010	.286	.038	.010	.004 <T
NOV	.022	.010	.268	.014	.010	.010
DEC	.014	.008 <T	.206	BDL	.012	.004 <T
NITRITE (MG/L)			DET'N LIMIT = 0.001		GUIDELINE = 1.000 (A1)	
JAN	.007	.001 <T	.004 <T	.002 <T	.001 <T	.001 <T
FEB	.006	.003 <T	.004 <T	.003 <T	.002 <T	.004 <T
MAR	.006	.003 <T	.009	.001 <T	.002 <T	.003 <T
APR	.005	.001 <T	.002 <T	.001 <T	.001 <T	.001 <T
MAY	.020	.002 <T	.004 <T	.004 <T	.004 <T	.004 <T
JUN	.018	.004 <T	.004 <T	.004 <T	.004 <T	.003 <T
JUL	.003 <T	.001 <T	.001 <T	.002 <T	.001 <T	.001 <T
AUG	.006	.003 <T	.005	.004 <T	.003 <T	.002 <T
SEP	.004 <T	.002 <T	.003 <T	.003 <T	.003 <T	.002 <T
OCT	.006	.001 <T	.001 <T	BDL	BDL	BDL
NOV	.018	.010	.018	.012	.012	.019
DEC	.006	.001 <T	.004 <T	.001 <T	.001 <T	BDL
TOTAL NITRATES (MG/L)			DET'N LIMIT = .020		GUIDELINE = 10.000 (A1)	
JAN	.210	.190	.315	.205	.190	.185
FEB	.230	.235	.240	.235	.235	.240
MAR	.250	.250	.255	.240	.250	.240
APR	.175	.180	.255	.190	.190	.195
MAY	.195	.185	.315	.240	.185	.170
JUN	.140	.125	.235	.165	.140	.130
JUL	.095 <T	.090 <T	.325	.135	.130	.100
AUG	.135	.125	.285	.125	.140	.100
SEP	.170	.155	.290	.150	.170	.155
OCT	.230	.230	.560	.285	.260	.220
NOV	.285	.275	.570	.295	.380	.290
DEC	.275	.275	.535	.305	.370	.265
NITROGEN TOT KJELD (MG/L)			DET'N LIMIT = .020		GUIDELINE =	N/A
JAN	.290	.150	.270	.160	.140	.130
FEB	.290	.110	.480	.160	.170	.160
MAR	.260	.070 <T	.110	.110	.070 <T	.080 <T
APR	.290	.130	.200	.130	.120	.130
MAY	.240	.100	.200	.110	.090 <T	.080 <T
JUN	.180	.150	.140	.170	.150	.350
JUL	.220	.120	.360	.130	.110	.080 <T

TABLE 5

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

SITE TYPE	WATER TREATMENT PLANT			DISTRIBUTION SYSTEM		
	RAW	TREATED	SITE 1			SITE 2
			STANDING	FREE FLOW	STANDING	FREE FLOW
AUG	.210	.160	.310	.130	.150	.110
SEP	.290	.130	.280	.160	.130	.140
OCT	.320	.170	.500	.210	.170	.150
NOV	.330	.150	.450	.170	.180	.240
DEC	.310	.120	.350	.130	.140	.130
PH (DMSNLESS )		DET'N LIMIT = N/A		GUIDELINE = 6.5-8.5(A4)		
JAN	7.580	8.400	7.900	7.960	8.000	8.090
FEB	7.500	8.320	7.620	7.970	7.900	8.200
MAR	7.520	7.720	7.950	7.950	7.940	8.050
APR	7.780	7.840	7.870	7.880	7.870	7.870
MAY	7.720	8.230	7.860	7.910	7.950	8.030
JUN	7.860	7.940	8.090	8.240	8.140	8.170
JUL	7.550	8.930	8.390	8.120	8.280	8.260
AUG	7.660	7.860	8.020	8.120	8.160	8.350
SEP	7.660	8.190	7.820	7.880	7.890	7.970
OCT	7.490	7.620	7.560	7.600	7.550	7.600
NOV	7.540	7.580	7.650	7.670	7.650	7.680
DEC	7.650	7.750	7.780	7.790	7.810	7.820
PHOSPHORUS FIL REACT (MG/L )		DET'N LIMIT = .5UG/L		GUIDELINE =		N/A
JAN	.002	.000 <T	.	.	.	.
FEB	.003	.003	.	.	.	.
MAR	.003	.003	.	.	.	.
APR	.003	.005	.	.	.	.
MAY	.003	.004	.	.	.	.
JUN	.002	.002	.	.	.	.
JUL	.003	.008	.	.	.	.
AUG	.003	.006	.	.	.	.
SEP	.004	.005	.	.	.	.
OCT	.003	.008	.	.	.	.
NOV	.003	.005	.	.	.	.
DEC	.004	.007	.	.	.	.
PHOSPHORUS TTL-UNFIL (MG/L )		DET'N LIMIT = .002		GUIDELINE = .40 (F2)		
JAN	.009 <T	.002 <T	.	.	.	.
FEB	.011	.009 <T	.	.	.	.
MAR	.012	.011	.	.	.	.
APR	.018	.016	.	.	.	.
MAY	.009 <T	.005 <T	.	.	.	.
JUN	.006 <T	.008 <T	.	.	.	.
JUL	.010	.015	.	.	.	.
AUG	.008 <T	.011	.	.	.	.
SEP	.017	.007 <T	.	.	.	.

TABLE 5

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

SITE TYPE	WATER TREATMENT PLANT			DISTRIBUTION SYSTEM		
	RAW	TREATED	SITE 1	SITE 2		
			STANDING	FREE FLOW	STANDING	FREE FLOW
OCT	.015	.011	.	.	.	.
NOV	.018	.008 <T	.	.	.	.
DEC	.009 <T	.007 <T	.	.	.	.
RESIDUE (TOTAL) (MG/L)	)	DET'N LIMIT = 1.		GUIDELINE = 500. (A3)		
JAN	56 CRO	93 CRO	94 CRO	93 CRO	93 CRO	94 CRO
FEB	67	91 CRO	103	90 CRO	91 CRO	91 CRO
MAR	63 CRO	95 CRO	100 CRO	101 CRO	100 CRO	99 CRO
APR	72	85 CRO	89 CRO	89 CRO	89 CRO	89 CRO
MAY	53 CRO	91 CRO	87 CRO	87 CRO	87 CRO	87 CRO
JUN	58 CRO	92 CRO	95 CRO	94 CRO	94 CRO	93 CRO
JUL	51 CRO	91 CRO	91 CRO	89 CRO	89 CRO	89 CRO
AUG	46 CRO	80 CRO	84 CRO	81 CRO	82 CRO	82 CRO
SEP	49 CRO	83 CRO	84 CRO	83 CRO	82 CRO	82 CRO
OCT	51 CRO	83 CRO	89 CRO	86 CRO	84 CRO	84 CRO
NOV	73	82 CRO	87 CRO	85 CRO	85 CRO	84 CRO
DEC	60 CRO	97 CRO	100 CRO	98 CRO	100 CRO	99 CRO
TURBIDITY (FTU)	)	DET'N LIMIT = .02		GUIDELINE = 1.00 (A1)		
JAN	4.200	.280	.140	.180	.240	.110
FEB	3.200	2.800	1.400	.410	.490	.180
MAR	2.900	.180	.330	.320	.260	.220
APR	4.700	.350	.350	.560	.320	.160
MAY	1.560	.650	.240	.780	.300	.380
JUN	1.890	.260	.180	.560	.330	.290
JUL	.960	.370	.420	.600	.200	.200
AUG	2.000	.190	.270	.290	.380	.240
SEP	1.330	.250	.180	.500	.200	.190
OCT	3.800	.340	.160	.750	.220	.160
NOV	9.300	.200	.230	.280	.280	.300
DEC	2.700	.290	.250	.350	.250	.140

TABLE 5

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE TYPE	RAW	TREATED	SITE 1	SITE 2		
			STANDING	FREE FLOW	STANDING	FREE FLOW
<b>METALS</b>						
ALUMINUM (MG/L)	)		DET'N LIMIT = .004		GUIDELINE = .10	(A4)
JAN	.180	.140	.081	.120	.053	.076
FEB	.210	.076	.073	.075	.110	.088
MAR	.260	.120	.100	.110	.130	.098
APR	.270	.084	.110	.130	.100	.087
MAY	.130	.110	.095	.110	.086	.081
JUN	.100	.063	.082	.085	.083	.075
JUL	.075	.120	.120	.220	.099	.093
AUG	.095	.092	.098	.082	.095	.092
SEP	.092	.100	.097	.110	.096	.110
OCT	.270	.140	.110	.190	.092	.098
NOV	.400	.130	.130	.150	.120	.120
DEC	.170	.180	.110	.110	.110	.100
BARIUM (MG/L)	)		DET'N LIMIT = 0.001		GUIDELINE = 1.000	(A1)
JAN	.016	.015	.014	.014	.011	.015
FEB	.017	.014	.018	.014	.016	.014
MAR	.017	.015	.017	.015	.018	.015
APR	.018	.017	.017	.016	.016	.016
MAY	.016	.016	.015	.015	.016	.016
JUN	.018	.019	.019	.017	.017	.018
JUL	.016	.014	.015	.015	.014	.015
AUG	.014	.014	.014	.013	.013	.013
SEP	.014	.013	.013	.013	.013	.013
OCT	.015	.013	.015	.014	.013	.013
NOV	.017	.014	.017	.013	.014	.014
DEC	.017	.016	.016	.015	.016	.015
BORON (MG/L)	)		DET'N LIMIT = 0.01		GUIDELINE = 5.000	(A1)
JAN	BDL	BDL	BDL	BDL	BDL	BDL
FEB	BDL	BDL	BDL	BDL	BDL	BDL
MAR	BDL	BDL	BDL	BDL	BDL	BDL
APR	BDL	.010	.010	.020	.010	.020
MAY	BDL	BDL	BDL	BDL	!SM	!SM
JUN	BDL	BDL	BDL	BDL	BDL	BDL
JUL	BDL	BDL	BDL	BDL	BDL	BDL
AUG	BDL	BDL	BDL	BDL	BDL	BDL
SEP	BDL	BDL	.010 <T	BDL	BDL	.010 <T
OCT	BDL	BDL	BDL	BDL	BDL	BDL
NOV	.010 <T	.015 <T	.012 <T	.014 <T	.010 <T	.007 <T
DEC	BDL	BDL	BDL	BDL	.005 <T	BDL
CADMIUM (UG/L)	)		DET'N LIMIT = 0.300		GUIDELINE = 5.000	(A1)
JAN	BDL	BDL	BDL	BDL	BDL	BDL

TABLE 5

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

SITE TYPE	WATER TREATMENT PLANT			DISTRIBUTION SYSTEM		
	RAW	TREATED	SITE 1			SITE 2
			STANDING	FREE FLOW	STANDING	FREE FLOW
FEB	BDL	BDL	.300	BDL	BDL	BDL
MAR	BDL	BDL	BDL	BDL	BDL	BDL
APR	BDL	BDL	BDL	BDL	BDL	BDL
MAY	BDL	BDL	BDL	BDL	BDL	BDL
JUN	BDL	BDL	BDL	BDL	BDL	BDL
JUL	BDL	BDL	BDL	BDL	BDL	BDL
AUG	BDL	BDL	BDL	BDL	BDL	BDL
SEP	BDL	BDL	BDL	BDL	BDL	BDL
OCT	BDL	BDL	BDL	BDL	BDL	BDL
NOV	BDL	BDL	BDL	BDL	BDL	BDL
DEC	BDL	BDL	BDL	BDL	BDL	BDL
COBALT (MG/L)		DET'N LIMIT = 0.001			GUIDELINE = 1.0	(H)
JAN	BDL	BDL	BDL	BDL	BDL	BDL
FEB	BDL	BDL	BDL	BDL	BDL	BDL
MAR	BDL	BDL	BDL	BDL	BDL	BDL
APR	BDL	BDL	BDL	BDL	BDL	BDL
MAY	BDL	BDL	BDL	BDL	BDL	.001
JUN	BDL	.001	.001	BDL	BDL	BDL
JUL	BDL	BDL	BDL	BDL	BDL	.001
AUG	BDL	BDL	BDL	BDL	BDL	BDL
SEP	BDL	BDL	BDL	BDL	BDL	BDL
OCT	BDL	BDL	BDL	BDL	BDL	BDL
NOV	.005	.002	BDL	BDL	.001	BDL
DEC	.005	.004	BDL	BDL	BDL	BDL
CHROMIUM (MG/L)		DET'N LIMIT = 0.001			GUIDELINE = .05	(A1)
JAN	.001	BDL	.001	BDL	BDL	BDL
FEB	.001	BDL	BDL	BDL	BDL	BDL
MAR	.001	BDL	BDL	BDL	BDL	BDL
APR	BDL	BDL	BDL	BDL	BDL	BDL
MAY	BDL	BDL	.002	BDL	BDL	BDL
JUN	.001	BDL	.001	BDL	BDL	BDL
JUL	BDL	BDL	BDL	BDL	BDL	BDL
AUG	BDL	.001	BDL	BDL	BDL	BDL
SEP	BDL	.001	.001	BDL	BDL	BDL
OCT	.001	BDL	.001	.001	BDL	BDL
NOV	.002	.001	.001	.001	BDL	.001
DEC	.001	BDL	.001	BDL	BDL	BDL
COPPER (MG/L)		DET'N LIMIT = .001			GUIDELINE = 1.0	(A3)
JAN	.007	.001	.012	.002	.005	.001
FEB	.009	.001	.055	.002	.011	.001
MAR	.009	.001	.015	.002	.015	.001

TABLE 5

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT			DISTRIBUTION SYSTEM		
SITE TYPE	RAW	TREATED	SITE 1	SITE 2	SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
APR	.016	.001	.023	.005	.010	.002
MAY	.010	.002	.021	.002	.008	.003
JUN	.016	.003	.034	.006	.009	.002
JUL	.023	.003	.022	.003	.006	.002
AUG	.025	.002	.080	.002	.010	.001
SEP	.022	.002	.023	.002	.009	.003
OCT	.015	.006	.036	.003	.007	.003
NOV	.004	.001	.040	.002	.016	.002
DEC	.005	.001	.034	.002	.015	.002
IRON (MG/L)		DET'N LIMIT = .002		GUIDELINE = .300 (A3)		
JAN	.190	.015	.017	.028	.006	.008
FEB	.230	.020	.022	.023	.014	.016
MAR	.380	.022	.025	.039	.020	.017
APR	.310	.022	.026	.043	.016	.014
MAY	.180	BDL	.015	.092	.012	.015
JUN	.190	.033	.027	.047	.035	.023
JUL	.210	.140	.120	.150	.585	.021
AUG	.120	.020	.021	.020	.021	.013
SEP	.280	.098	.340	.038	.052	.400
OCT	.300	.032	.024	.085	.014	.021
NOV	.430	.019	.019	.037	.014	.012
DEC	.230	.027	.025	.050	.014	.012
MERCURY (UG/L)		DET'N LIMIT = 0.010		GUIDELINE = 1.000 (A1)		
JAN	BDL	BDL	-	BDL	-	BDL
FEB	.020	.020	-	BDL	-	BDL
MAR	.020	.020	-	BDL	-	BDL
APR	.030	.020	-	.010	-	.010
MAY	.040	.040	-	.010	-	.010
JUN	.050	.060	-	.020	-	.010
JUL	.040	.040	-	.010	-	.010
AUG	.050	.070	-	.020	-	.020
SEP	.060	.080	-	.020	-	.020
OCT	.040	.020	-	.020	-	.030
NOV	.070	.070	-	.020	-	.030
DEC	.050	.060	-	.050	-	.040
MANGANESE (MG/L)		DET'N LIMIT = .001		GUIDELINE = .050 (A3)		
JAN	.009	.005	.003	.005	.002	.004
FEB	.010	.010	.006	.008	.007	.008
MAR	.013	.010	.007	.011	.011	.010
APR	.015	.009	.008	.011	.008	.007
MAY	.012	.012	.009	.031	.007	.006

TABLE 5

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE	RAW	TREATED	SITE 1		SITE 2	
TYPE			STANDING	FREE FLOW	STANDING	FREE FLOW
JUN	.017	.010	.006	.011	.013	.006
JUL	.017	.011	.009	.017	.010	.006
AUG	.012	.006	.004	.005	.006	.004
SEP	.012	.007	.007	.015	.008	.007
OCT	.023	.013	.005	.021	.009	.010
NOV	.025	.008	.003	.007	.005	.004
DEC	.018	.011	.005	.011	.005	.006
MOLYBDENUM (MG/L)			DET'N LIMIT = 0.001		GUIDELINE = .50	(H)
JAN	BDL	BDL	BDL	BDL	BDL	BDL
FEB	BDL	BDL	BDL	BDL	BDL	BDL
MAR	BDL	BDL	BDL	BDL	BDL	BDL
APR	BDL	BDL	BDL	BDL	BDL	.001
MAY	BDL	BDL	BDL	BDL	BDL	BDL
JUN	BDL	BDL	BDL	BDL	BDL	BDL
JUL	BDL	BDL	BDL	BDL	BDL	BDL
AUG	BDL	BDL	BDL	BDL	.001	BDL
SEP	BDL	BDL	BDL	BDL	BDL	BDL
OCT	BDL	BDL	BDL	BDL	BDL	.001
NOV	BDL	BDL	BDL	BDL	BDL	BDL
DEC	BDL	BDL	BDL	BDL	BDL	BDL
NICKEL (MG/L)			DET'N LIMIT = 0.001		GUIDELINE = .05	(F3)
JAN	BDL	BDL	BDL	BDL	BDL	BDL
FEB	BDL	BDL	BDL	BDL	BDL	BDL
MAR	BDL	BDL	BDL	BDL	BDL	BDL
APR	BDL	BDL	BDL	BDL	BDL	BDL
MAY	BDL	BDL	BDL	BDL	BDL	BDL
JUN	BDL	BDL	BDL	BDL	BDL	BDL
JUL	.002	.002	.002	BDL	BDL	BDL
AUG	BDL	BDL	BDL	BDL	BDL	BDL
SEP	BDL	BDL	BDL	BDL	BDL	BDL
OCT	.001	.001	.001	.002	.001	.001
NOV	.002	.002	.002	.001	.001	.001
DEC	.001	.001	.001	.001	.001	.001
LEAD (MG/L)			DET'N LIMIT = 0.003		GUIDELINE = .050	(A1)
JAN	BDL	BDL	.006	BDL	BDL	BDL
FEB	BDL	BDL	.220	.008	BDL	BDL
MAR	BDL	BDL	.015	.008	BDL	BDL
APR	BDL	BDL	.023	.008	BDL	BDL
MAY	BDL	BDL	.013	.009	.004	.004
JUN	.007	.005	.041	.022	.008	.008
JUL	BDL	BDL	.017	.011	.004	BDL

TABLE 5

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE TYPE	RAW	TREATED	SITE 1	SITE 2		
			STANDING	FREE FLOW	STANDING	FREE FLOW
AUG	BDL	BDL	.012	.004	BDL	BDL
SEP	BDL	BDL	.010	BDL	BDL	BDL
OCT	BDL	BDL	.009	.007	BDL	BDL
NOV	BDL	BDL	.009	.003	BDL	BDL
DEC	BDL	BDL	.010	BDL	BDL	BDL
STRONTIUM (MG/L)			DET'N LIMIT = .001		GUIDELINE = 2.00	(H)
JAN	.042	.046	.043	.047	.034	.045
FEB	.045	.058	.062	.057	.059	.057
MAR	.049	.062	.066	.065	.064	.062
APR	.046	.059	.060	.059	.060	.061
MAY	.046	.063	.058	.057	.059	.058
JUN	.053	.068	.070	.067	.070	.071
JUL	.046	.062	.062	.062	.062	.060
AUG	.041	.055	.056	.055	.054	.056
SEP	.042	.054	.053	.055	.054	.054
OCT	.039	.051	.053	.052	.052	.050
NOV	.042	.051	.055	.050	.052	.051
DEC	.050	.064	.065	.063	.066	.063
URANIUM (UG/L)			DET'N LIMIT = .02		GUIDELINE = 20. (A2)	
JAN	BDL	BDL	BDL	BDL	BDL	BDL
FEB	.100	BDL	BDL	BDL	BDL	BDL
MAR	BDL	BDL	BDL	BDL	BDL	BDL
APR	.080	.020	.020	.010	.030	.020
MAY	.080	.030	.010	.020	.000	.000
JUN	.070	.010	.010	.010	.010	.010
JUL	.080	.050	.050	.050	.050	.050
AUG	BDL	BDL	BDL	BDL	BDL	BDL
SEP	.050	.020	.020	.020	.020	.010
OCT	.100	BDL	BDL	BDL	BDL	BDL
NOV	.100	BDL	BDL	BDL	BDL	BDL
DEC	.100	.030	.030	.030	.030	.030
VANADIUM (MG/L)			DET'N LIMIT = .001		GUIDELINE = .10 (H)	
JAN	BDL	.001	.001	BDL	BDL	BDL
FEB	BDL	.001	.001	.001	BDL	.001
MAR	BDL	BDL	BDL	BDL	BDL	.001
APR	BDL	.001	.001	.001	.001	.001
MAY	.001	.001	.001	.001	.001	BDL
JUN	.001	.001	.001	.001	.001	.001
JUL	BDL	.001	.001	BDL	.001	.001
AUG	.001	.001	.001	.001	.001	.001
SEP	.001	.001	BDL	BDL	.002	.002

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

SITE TYPE	WATER TREATMENT PLANT			DISTRIBUTION SYSTEM		
	RAW	TREATED	SITE 1	SITE 2		
			STANDING	FREE FLOW	STANDING	FREE FLOW
OCT	BDL	BDL	BDL	BDL	BDL	BDL
NOV	.002	.001	.001	.002	BDL	.002
DEC	BDL	BDL	BDL	BDL	.001	BDL
ZINC (MG/L)			DET'N LIMIT = .001		GUIDELINE = 5.00 (A3)	
JAN	.004	.017	.006	.005	.004	.002
FEB	.003	.002	2.400	.014	.005	.002
MAR	.001	.006	.007	.002	.005	.002
APR	.004	.003	.008	.004	.015	.001
MAY	.004	.005	.009	.010	.012	.010
JUN	.003	.002	.015	.007	.005	.002
JUL	.003	.002	.006	.004	.004	.006
AUG	.003	.008	.006	.009	.018	.002
SEP	BDL	BDL	.005	.002	.008	BDL
OCT	.004	.004	.007	.004	.007	.003
NOV	.005	BDL	.005	BDL	.011	BDL
DEC	.003	.002	.006	.003	.007	.002

TABLE 5

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE TYPE	RAW	TREATED	SITE 1	SITE 2		
			STANDING	FREE FLOW	STANDING	FREE FLOW
<b>CHLOROAROMATICS</b>						
1235 T-CHLOROBENZENE (NG/L)			DET'N LIMIT = 1.000		GUIDELINE = 10000. (I)	
JAN	BDL	BDL	.	BDL	.	BDL
FEB	.	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	3.000 <T
MAY	.	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	ILA	ILA	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	BDL	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
1245 T-CHLOROBENZENE (NG/L)			DET'N LIMIT = 1.000		GUIDELINE = 38000. (D4)	
JAN	BDL	BDL	.	BDL	.	BDL
FEB	.	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	1.000 <T	.	BDL	.	BDL
MAY	.	BDL	.	BDL	.	BDL
JUN	BDL	1.000 <T	.	BDL	.	BDL
JUL	ILA	ILA	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	BDL	.	10.000 <T
DEC	BDL	BDL	.	BDL	.	BDL
HEXACHLOROETHANE (NG/L)			DET'N LIMIT = 1.000		GUIDELINE = 1900. (D4)	
JAN	3.000 <T	5.000 <T	.	1.000 <T	.	BDL
FEB	.	5.000 <T	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	16.000
APR	BDL	2.000 <T	.	BDL	.	1.000 <T
MAY	.	2.000 <T	.	14.000	.	5.000 <T
JUN	BDL	4.000 <T	.	BDL	.	BDL
JUL	ILA	ILA	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	BDL	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
236 TRICHLOROTOLUENE (NG/L)			DET'N LIMIT = 5.000		GUIDELINE = N/A	
JAN	BDL	BDL	.	BDL	.	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

SITE TYPE	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
FEB	.	11.000 <T	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	.	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	!LA	!LA	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	BDL	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL

TABLE 5

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE TYPE	RAW	TREATED	SITE 1	SITE 2		
			STANDING	FREE FLOW	STANDING	FREE FLOW
<b>PESTICIDES &amp; PCB</b>						
ALPHA BHC (NG/L)	)		DET'N LIMIT = 1.000		GUIDELINE = 700.	(G)
JAN	2.000 <T	1.000 <T	.	2.000 <T	.	2.000 <T
FEB	.	2.000 <T	.	1.000 <T	.	1.000 <T
MAR	3.000 <T	4.000 <T	.	2.000 <T	.	2.000 <T
APR	1.000 <T	1.000 <T	.	BDL	.	BDL
MAY	.	1.000 <T	.	3.000 <T	.	1.000 <T
JUN	BDL	1.000 <T	.	3.000 <T	.	2.000 <T
JUL	!LA	!LA	.	1.000 <T	.	1.000 <T
AUG	BDL	BDL	.	BDL	.	BDL
SEP	3.000 <T	BDL	.	1.000 <T	.	BDL
OCT	BDL	BDL	.	BDL	.	2.000 <T
NOV	BDL	1.000 <T	.	2.000 <T	.	1.000 <T
DEC	2.000 <T	1.000 <T	.	1.000 <T	.	1.000 <T
LINDANE (NG/L)	)		DET'N LIMIT = 1.000		GUIDELINE = 4000.0 (A1)	
JAN	BDL	BDL	.	BDL	.	BDL
FEB	.	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	1.000 <T	.	BDL	.	BDL
MAY	.	BDL	.	8.000 <T	.	BDL
JUN	BDL	1.000 <T	.	BDL	.	2.000 <T
JUL	!LA	!LA	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	2.000 <T
NOV	BDL	BDL	.	1.000 <T	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL

TABLE 5

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

SITE TYPE	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
<b>PHENOLICS</b>						
PHENOL (UG/L)	)		DET'N LIMIT = 0.2		GUIDELINE = 2.00 (A3)	
JAN	.400 <T	BDL	.	.	.	.
FEB	.800 <T	.400 <T	.	.	.	.
MAR	.800 <T	.600 <T	.	.	.	.
APR	1.200 CIC	.800 <T	.	.	.	.
MAY	.400 <T	.400 <T	.	.	.	.
JUN	.600 <T	1.200	.	.	.	.
JUL	BDL	BDL	.	.	.	.
AUG	.200 <T	.400 <T	.	.	.	.
SEP	.600 <T	.600 <T	.	.	.	.
OCT	BDL	.600 <T	.	.	.	.
NOV	.200 <T	.200 <T	.	.	.	.
DEC	.200 <T	BDL	.	.	.	.

TABLE 5

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE TYPE	RAW	TREATED	SITE 1	SITE 2		
			STANDING	FREE FLOW	STANDING	FREE FLOW
<b>VOLATILES</b>						
TOLUENE (UG/L)	)		DET'N LIMIT = 0		GUIDELINE = 100.0	(G)
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	.700	.	.100 <T	.	BDL
DEC	BDL	BDL	.	.050 UCS	.	BDL
ETHYLBENZENE (UG/L)	)		DET'N LIMIT = 0		GUIDELINE = 3400.	(D3)
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	.200 <T	.	.100 <T	.	.150 <T
JUL	BDL	.250 <T	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	.100 <T	.	BDL	.	.050 <T
DEC	BDL	.100 <T	.	BDL	.	BDL
P-XYLENE (UG/L)	)		DET'N LIMIT = 0		GUIDELINE = 620.	(G)
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	.000 RMP	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	BDL	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
M-XYLENE (UG/L)	)		DET'N LIMIT = 0		GUIDELINE = 620.	(G)
JAN	BDL	BDL	.	BDL	.	BDL

TABLE 5

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

SITE TYPE	WATER TREATMENT PLANT			DISTRIBUTION SYSTEM		
	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	.100 <T	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	BDL	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
0-XYLENE (UG/L)	DET'N LIMIT = 0			GUIDELINE = 620. (G)		
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	.050 <T	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	BDL	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
1,1 DICHLOROETHYLENE (UG/L)	DET'N LIMIT = 0			GUIDELINE = 7.0 (D1)		
JAN	BDL	.000 APS	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	BDL	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
DICHLOROMETHANE (UG/L)	DET'N LIMIT = 0			GUIDELINE = 1750. (D3)		
JAN	!CS	!CS	.	!CS	.	!CS
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	!CS	.	!CS	.	!CS

TABLE 5

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

SITE TYPE	WATER TREATMENT PLANT			DISTRIBUTION SYSTEM		
	RAW	TREATED	SITE 1	STANDING	FREE FLOW	SITE 2
						FREE FLOW
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	!CS	!CS	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	BDL	.	BDL
DEC	BDL	BDL	.	1.500 UCS	.	BDL
CHLOROFORM (UG/L)		DET'N LIMIT = 0		GUIDELINE = 350.0 (A1+)		
JAN	BDL	69.000	.	51.000	.	62.000
FEB	BDL	48.000	.	43.000	.	46.000
MAR	BDL	55.000	.	53.000	.	65.000
APR	BDL	70.000	.	60.000	.	80.000
MAY	BDL	104.000	.	79.900	.	90.400
JUN	BDL	124.000	.	106.000	.	127.000
JUL	.400 <T	180.000	.	135.000	.	185.000
AUG	BDL	200.000	.	170.000	.	180.000
SEP	BDL	170.000	.	160.000	.	170.000
OCT	.300 <T	161.000	.	106.000	.	148.000
NOV	.300 <T	140.000	.	125.000	.	130.000
DEC	.100 UCS	119.000	.	64.800	.	105.900
DICHLOROBROMOMETHANE (UG/L)		DET'N LIMIT = 0		GUIDELINE = 350.0 (A1+)		
JAN	BDL	1.000	.	1.000	.	1.000
FEB	BDL	1.000	.	1.000	.	1.000
MAR	BDL	1.000	.	1.000	.	1.000
APR	BDL	1.000	.	1.000	.	1.000
MAY	BDL	1.650	.	1.550	.	1.700
JUN	BDL	2.900	.	2.200	.	2.700
JUL	BDL	3.300	.	3.200	.	3.300
AUG	BDL	4.000	.	3.100	.	3.400
SEP	BDL	3.200	.	2.900	.	3.000
OCT	BDL	3.000	.	2.400	.	2.800
NOV	BDL	2.500	.	1.900	.	2.500
DEC	BDL	2.400	.	1.900	.	2.300
CHLORODIBROMOMETHANE (UG/L)		DET'N LIMIT = 0		GUIDELINE = 350.0 (A1+)		
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	1.000	.	1.000	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL

TABLE 5

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

SITE TYPE	WATER TREATMENT PLANT			DISTRIBUTION SYSTEM		
	RAW	TREATED	SITE 1	STANDING	FREE FLOW	SITE 2
JUN	BDL	BDL	-	BDL	-	BDL
JUL	BDL	.900 <T	-	BDL	-	BDL
AUG	BDL	BDL	-	BDL	-	BDL
SEP	BDL	BDL	-	BDL	-	BDL
OCT	BDL	BDL	-	BDL	-	BDL
NOV	BDL	BDL	-	BDL	-	BDL
DEC	BDL	.300 <T	-	BDL	-	BDL
1,4 DICHLOROBENZENE (UG/L)			DET'N LIMIT = 0	GUIDELINE = 75.0 (D1)		
JAN	BDL	BDL	-	BDL	-	BDL
FEB	BDL	BDL	-	BDL	-	BDL
MAR	BDL	BDL	-	BDL	-	BDL
APR	BDL	BDL	-	BDL	-	BDL
MAY	BDL	BDL	-	BDL	-	BDL
JUN	BDL	BDL	-	BDL	-	BDL
JUL	BDL	BDL	-	BDL	-	BDL
AUG	BDL	BDL	-	BDL	-	BDL
SEP	BDL	BDL	-	BDL	-	BDL
OCT	BDL	BDL	-	BDL	-	BDL
NOV	BDL	.200 <T	-	BDL	-	BDL
DEC	BDL	.200 <T	-	BDL	-	BDL
TOTL TRIHALOMETHANES (UG/L)			DET'N LIMIT = 0	GUIDELINE = 350.0 (A1)		
JAN	BDL	70.000	-	52.000	-	63.000
FEB	BDL	50.000	-	45.000	-	47.000
MAR	BDL	56.000	-	54.000	-	66.000
APR	BDL	71.000	-	61.000	-	81.000
MAY	BDL	105.650	-	81.450	-	92.100
JUN	BDL	126.900	-	108.200	-	129.700
JUL	.400	184.200	-	138.200	-	188.300
AUG	BDL	204.000	-	173.100	-	183.400
SEP	BDL	173.200	-	162.900	-	173.000
OCT	.300	164.000	-	108.400	-	150.800
NOV	.300	142.500	-	126.900	-	132.500
DEC	.100 UCS	121.400	-	66.700	-	108.200

TABLE 6

DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

COUNT OF PARAMETERS NOT FOUND ABOVE THE DETECTION LIMIT						
SCAN	PARAMETER	ANALYSED	DETECTION LIMIT	GUIDELINE		
CHEMISTRY (LAB)	CYANIDE	48	0.001	.200	(A1)	MG/L
METALS	ARSENIC	72	0.001	.050	(A1)	MG/L
	BERYLLIUM	72	0.001	.0002	(H)	MG/L
	CYANIDE	48	0.001	.200	(A1)	MG/L
	SELENIUM	72	0.001	.010	(A1)	MG/L
CHLOROAROMATICS	HEXACHLOROBUTADIENE	46	1.000	450.	(D4)	NG/L
	123 TRICHLOROBENZENE	46	5.000	10000.	(I)	NG/L
	1234 T-CHLOROBENZENE	46	1.000	10000.	(I)	NG/L
	124 TRICHLOROBENZENE	46	5.000	10000.	(I)	NG/L
	135 TRICHLOROBENZENE	46	5.000	10000.	(D4)	NG/L
	OCTACHLOROSTYRENE	46	1.000	N/A	NG/L	
	PENTACHLOROBENZENE	46	1.000	74000.	(D4)	NG/L
	245 TRICHLOROTOLUENE	46	5.000	N/A	NG/L	
	26A TRICHLOROTOLUENE	46	5.000	N/A	NG/L	
CHLOROPHENOLS	234 TRICHLOROPHENOL	4	50.	N/A	NG/L	
	2345 T-CHLOROPHENOL	4	50.	N/A	NG/L	
	2356 T-CHLOROPHENOL	4	50.	N/A	NG/L	
	245-TRICHLOROPHENOL	4	50.	2600000	(D4)	NG/L
	246-TRICHLOROPHENOL	4	50.	10000.	(C1)	NG/L
	PENTACHLOROPHENOL	4	50.	10000.	(C1)	NG/L
PAH	PHENANTHRENE	8	0	N/A	NG/L	
	ANTHRACENE	8	0	N/A	NG/L	
	FLUORANTHENE	8	0	42000	(D4)	NG/L
	PYRENE	8	0	N/A	NG/L	
	BENZO(A)ANTHRACENE	8	0	N/A	NG/L	
	CHRYSENE	8	0	N/A	NG/L	
	DIMETH. BENZ(A)ANTHR	8	0	N/A	NG/L	
	BENZO(E)PYRENE	8	0	N/A	NG/L	
	BENZO(J) FLUORANTHEN	8	N/A	N/A	NG/L	
	BENZO(B) FLUORANTHEN	8	0	N/A	NG/L	
	PERYLENE	8	0	N/A	NG/L	
	BENZO(K) FLUORANTHEN	8	N/A	N/A	NG/L	
	BENZO (A) PYRENE	8	0	10	(B1)	NG/L
	BENZO(G,H,I) PERYLEN	8	0	N/A	NG/L	
	DIBENZO(A,H) ANTHRAC	8	0	N/A	NG/L	
	INDENO(1,2,3-C,D) PY	8	0	N/A	NG/L	
	BENZO(B) CHRYSENE	8	0	N/A	NG/L	
	ANTHANTHRENE	8	N/A	N/A	NG/L	
	CORONENE	8	0	N/A	NG/L	
PESTICIDES & PCB	ALDRIN	46	1.000	700.0	(A1)	NG/L
	BETA BHC	46	1.000	300.	(G)	NG/L
	ALPHA CHLORDANE	46	2.000	7000.0	(A1)	NG/L
	GAMMA CHLORDANE	46	2.000	7000.0	(A1)	NG/L
	DIELDRIN	46	2.000	700.0	(A1)	NG/L
	METHOXYPHOR	46	5.000	100000.	(A1)	NG/L
	THIODAN I	46	2.000	74000.	(D4)	NG/L

TABLE 6

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

## COUNT OF PARAMETERS NOT FOUND ABOVE THE DETECTION LIMIT

SCAN	PARAMETER	ANALYSED	DETECTION LIMIT	GUIDELINE
PESTICIDES & PCB	THIODAN II	46	4.000	74000. (D4) NG/L
	ENDRIN	46	4.000	200.0 (A1) NG/L
	THIODAN SULPHATE	46	4.000	N/A NG/L
	HEPTACHLOR EPOXIDE	46	1.000	3000.0 (A1) NG/L
	HEPTACHLOR	46	1.000	3000.0 (A1) NG/L
	MIREX	46	5.000	N/A NG/L
	OXYCHLORDANE	46	2.000	N/A NG/L
	OPDDT	46	5.000	30000. (A1) NG/L
	PCB	46	20.000	3000. (A2) NG/L
	PP-DDD	46	5.000	N/A NG/L
	PPDDE	46	1.000	30000. (A1) NG/L
	PPDDT	46	5.000	30000. (A1) NG/L
	ATRATONE	48	50.	N/A NG/L
	ALACHLOR	48	500.	35000. (D2) NG/L
	ETHYLENE DIBROMIDE	48	0	50.0 (G) UG/L
	HCB	46	1.000	10.0 (C1) NG/L
SPECIFIC PESTICIDES	TOXAPHENE	46	N/A	5000. (A1) NG/L
	AMETRYNE	48	50.00	300000.(D3) NG/L
	ATRAZINE	48	50.00	60000. (B3) NG/L
	BLADEX	48	100.00	10000. (B3) NG/L
	PROMETONE	48	50.00	52500. (D3) NG/L
	PROPAZINE	48	50.00	16000. (D2) NG/L
	PROMETRYNE	48	50.00	1000. (B3) NG/L
	SENCOR	48	100.00	80000. (B2) NG/L
	SIMAZINE	48	50.00	10000. (B3) NG/L
	2,4,5-T	4	50.00	35000. (D2) NG/L
	2,4-D	4	100.00	100000.(A1) NG/L
	24DCHLRPHENOXYBUTYRC	4	200.00	18000. (B3) NG/L
	2,4-DP	4	100.00	N/A NG/L
	DICAMBA	4	100.00	87000. (B3) NG/L
	PICHLORAM	4	100.00	2450000(D3) NG/L
	SILVEX	4	50.00	10000. (A1) NG/L
	DIAZINON	4	20.	14000. (A1) NG/L
	DICHLOROVOS	4	20.	N/A NG/L
	DURSBAN	4	20.	N/A NG/L
	ETHION	4	20.	35000. (G) NG/L
	GUTHION	4	N/A	N/A NG/L
	MALATHION	4	20.	160000. (G) NG/L
	MEVINPHOS	4	20.	N/A NG/L
	METHYL PARATHION	4	50.	7000. (B3) NG/L
	METHYLTRITHION	4	20.	N/A NG/L
	PARATHION	4	20.	35000. (B1) NG/L
	PHORATE	4	20.	35.0 (D2) NG/L
	RELDAN	4	20.	N/A NG/L
	RONNEL	4	20.	N/A NG/L
	AMINOCARB	4	N/A	N/A NG/L
	BENOMYL	4	N/A	N/A NG/L
	BUX	4	2000.	N/A NG/L
	CARBOFURAN	4	2000.	18000. (D3) NG/L
	CIPC	4	2000.	350000. (G) NG/L
	DIALLATE	4	2000.	30000. (H) NG/L

TABLE 6

## DRINKING WATER SURVEILLANCE PROGRAM LEMIEUX ISLAND WATER TREATMENT PLANT 1987

## COUNT OF PARAMETERS NOT FOUND ABOVE THE DETECTION LIMIT

SCAN	PARAMETER	ANALYSED	DETECTION LIMIT	GUIDELINE
SPECIFIC PESTICIDES	EPTAM	4	2000.	N/A NG/L
	IPC	4	2000.	N/A NG/L
	PROPOXUR	4	2000.	90000. (G) NG/L
	SEVIN	4	200.	70000. (A1) NG/L
	SUTAN	4	2000.	245000. (D3) NG/L
	METOLACHLOR	48	500.	50000. (B3) NG/L
VOLATILES	BENZENE	48	0	5.0 (D1) UG/L
	T1,2DICHLOROETHYLENE	48	0	350. (D3) UG/L
	1,1 DICHLOROETHANE	48	0	N/A UG/L
	111, TRICHLOROETHANE	48	0	200. (D1) UG/L
	1,2 DICHLOROETHANE	48	0	5.0 (D1) UG/L
	CARBON TETRACHLORIDE	48	0	5.0 (D1) UG/L
	1,2 DICHLOROPROPANE	48	0	10.0 (G) UG/L
	TRICHLOROETHYLENE	48	0	5.0 (D1) UG/L
	112 TRICHLOROETHANE	48	0	.60 (D4) UG/L
	T-CHLOROETHYLENE	48	0	10.0 (C2) UG/L
	BROMOFORM	48	0	350.0 (A1+) UG/L
	1122 T-CHLOROETHANE	48	0	0.17 (D4) UG/L
	CHLOROBENZENE	48	0	1510. (D3) UG/L
	1,3 DICHLOROBENZENE	48	0	130. (G) UG/L
	1,2 DICHLOROBENZENE	48	0	130. (G) UG/L
	TRIFLUOROCHLOROTOLUE	48	0	N/A UG/L
	ETHYLENE DIBROMIDE	48	0	50.0 (G) UG/L

Appendix A

DRINKING WATER SURVEILLANCE PROGRAM

The Drinking Water Surveillance Program (DWSP) for Ontario monitors drinking water quality at municipal water supply systems. The DWSP Database Management System provides a computerized drinking water quality information system for the supplies monitored. The objectives of the program are to provide:

- immediate, reliable, current information on drinking water quality,
- a flagging mechanism for 'Objective' exceedence,
- a definition of contaminant levels and trends,
- a comprehensive background for remedial action,
- a framework for assessment of new contaminants,
- and an indication of treatment efficiency of plant processes.

Program

The DWSP officially began in April 1986 and is designed to eventually include all municipal water supplies in Ontario; currently 44 plants are being monitored. Water supply locations have been prioritized for surveillance, based primarily on criteria such as population density, probability of contamination and geographical location.

An ongoing assessment of future monitoring requirements at each location will be made. Monitoring will continue at the initial locations at an appropriate level and further locations will be phased into the program as resources permit. It is estimated that after 4 years of operation, the program will be monitoring 90 locations.

A major goal of the program is to collect valid water quality data, in context with plant operational characteristics at the time of sampling. As soon as sufficient data have been accumulated and analysed, both the frequency of sampling and the range of parameters may be adjusted accordingly.

Assessments are carried out at all locations prior to initial sampling in order to acquire complete plant process and distribution system details, and to designate ( and retrofit if necessary ) all sampling systems and locations. This ensures that the sampled water is a reflection of the water itself.

Samples are taken of the raw ( ambient water ) and the treated water at the treatment plant, and of consumer's tap water in the distribution system. In order to determine possible effects of distribution on water quality, both standing and free flow water in old and new sections of the distribution system are sampled.

Sampling is carried out by operational personnel who have been trained in the applicable procedures.

Comprehensive standardized procedures and Field Test kits are supplied to sampling personnel. This ensures that samples are taken and handled according to standard protocols and that field testing will supply reliable data. All field and laboratory analyses are carried out using "approved documented procedures". All laboratory analyses are carried out by the MOE Laboratory Services Branch.

#### Data Reporting Mechanism

When the analytical results are transferred from the MOE laboratory into the DWSP system, printouts of the completed analyses are sent to the MOE District Officer, the appropriate operational staff and are also retained by the DWSP co-ordinator.

#### DWSP INPUTS AND OUTPUTS

The DWSP INPUTS and OUTPUTS are illustrated in Fig. 1.

#### PROGRAM INPUTS

#### PLANT AND DISTRIBUTION SYSTEM DESCRIPTION

The system description includes plant specific non-analytical information acquired through a questionnaire and initial plant visit. During the initial assessment of the plant and distribution system the questionnaire content is verified and

missing information added. It is intended that all data be kept current with scheduled annual updates.

The PLANT and DISTRIBUTION SYSTEM DESCRIPTION consists of the following seven components.

1. Process component inventory

All physical and chemical processes that the water is subjected to, from the intake pipe to the consumers' tap (where possible), are documented. These include: process type, general description of physical structures, material types, sizes, and retention time for each process within the plant. The processes may be as simple as transmission or as complex as carbon adsorption.

2. Treatment chemicals

Chemicals used in the treatment processes, their function, application point, supplier and brand-name are recorded. The chemical dosages applied on the day of sampling are recorded in DWSP.

3. Process control measurements

Documentation of in-plant monitoring of process parameters (turbidity, chlorine residuals, pH, aluminum residuals) including methods used, monitoring locations and frequency is contained in this section. In-plant monitoring results are generally not retained in DWSP but are retained by the Water Treatment Plant.

#### 4. Design flow and retention time

The hydraulic capacity, designed and actual, is noted here. Retention time (the time that a block of water is retained in the plant) is also noted. The maximum, minimum and average flow as well as a record of the flow rate on the day of sampling are recorded in DWSP.

#### 5. Distribution system description

This area includes the storage and transmission characteristics of the distribution system after the water leaves the plant.

#### 6. Sampling system

Each plant is assessed for its adequacy in terms of sampling of bacteriological, organic and inorganic parameters. The prime considerations in the assessment and design of the sampling system are:

- i/ the sample is an accurate representation of the actual water condition, eg. raw water has had no chemical treatment;
- ii/ the water being sampled is not being modified by the sampling system;
- iii/ the sample tap must be in a clean area of the plant, preferably a lab area;
- iv/ the sample lines must be organically inert (no plastic, ideally stainless steel).

It is imperative that the sampled water be a reflection not of the sampling system but of the water itself.

The sampling system documentation includes: origin of the water; date sampling was initiated; size, length and material type (intake, discharge and tap), pump characteristics (model, type, capacity) and flow rate.

#### 7. People

This section contains the names, addresses and phone numbers of current plant management and operational staff, distribution system management and operational staff, Medical Officer of Health and appropriate Ministry of Environment personnel associated with the plant.

#### FIELD DATA

The second major input to DWSP is field data.

Field data is collected at the plant and from the distribution system sites on the day of sampling. The field data consists of general operating conditions and the results of testing for field parameters. General operating conditions include chemicals used, dosages, flow and retention time on the day of sampling as well as monthly maximum, minimum and average flows. Field parameters include turbidity, chlorine residuals (free, combined and total), temperature and pH. These parameters are analysed according to standardized DWSP protocols to allow for interplant comparison.

#### LABORATORY ANALYTICAL DATA

The third major input to DWSP is Laboratory Analytical Data.

Samples gathered from the raw, treated and distribution sampling sites are analyzed for approximately 160 parameters at a frequency of two to twelve times per year. Sixty-five percent of the parameters are organic. The parameters measured may have health or aesthetic implications when present in drinking water. Many of the parameters may be used in the treatment process or may be treatment by-products. Due to the nature of certain analytical instruments parameters may be measured for in a "scan" producing some results for parameters that are not on the DWSP priority list but which may be of interest. The majority of the parameters are measured on a routine basis however, those that are technically more difficult and/or costly to analyse for are done less frequently. These include Specific Pesticides and Chlorophenols.

Although the parameter list is extensive, additional parameters with the potential to cause health or aesthetic related problems may be added provided reliable analytical and sampling methods exist.

All laboratory generated data is derived from standardized, documented analytical protocols. The analytical method is an integral part of the data and as methods change notation will be made and intercomparison data documented.

#### PARAMETER REFERENCE INFORMATION

The fourth major input to DWSP is Parameter Reference Information

This is a catalogue of information for each substance analysed on DWSP. It includes parameter name and aliases, physical and chemical properties, basic toxicology, world-wide health limits, treatment methods and uses. The Parameter Reference Information is computerized and can be accessed through the Query function of the DWSP database.

An example is shown in fig. 2.

A written copy (hard version) of the Parameter Reference Information will be available in the near future and is a new and sophisticated enhancement to the DWSP.

#### PROGRAM OUTPUTS

There are four major program outputs, Query, Action Alert, Report Generation and the Annual Report.

#### QUERY

All DWSP information is easily accessed through the Query function, therefore anything from addresses of plant personnel to complete water quality information for a plant's water supply is instantly available. The DWSP computer system makes relatively complex inquiries manageable. A personal password allowing access into the DWSP query mode in all MOE offices is being developed by the DWSP group.

#### ACTION ALERTS

Drinking Water quality in Ontario is evaluated against provincial objectives as outlined in the publication, Ontario Drinking Water Objectives (ISBN 0-7729-2725-1 revised 1983). This publication contains health-related Maximum Acceptable Concentrations for thirty substances. Should the reported level of a substance in treated water exceed the Ontario Drinking Water Objective an "Action Alert" requiring resampling and confirmation is issued. This assures that operational staff, health authorities and the public are notified as soon as possible of confirmation of an exceedance and remedial action taken. This report supplies a history of the occurrence of past exceedences at the plant plus a historical summary on the parameter of concern.

In the absence of Ontario Drinking Water Objectives, other agency guidelines which are documented in the Parameter Reference Information may be used. If these guidelines are exceeded the results are flagged and evaluated by DWSP personnel. An "Action Alert" will be issued if warranted.

#### REPORT GENERATION

Custom reports can be generated from DWSP to meet the needs of the regions and to respond to public requests.

#### ANNUAL REPORTS

It is the practice of DWSP to produce an annual report containing analytical data along with companion plant information.

FIG. 1

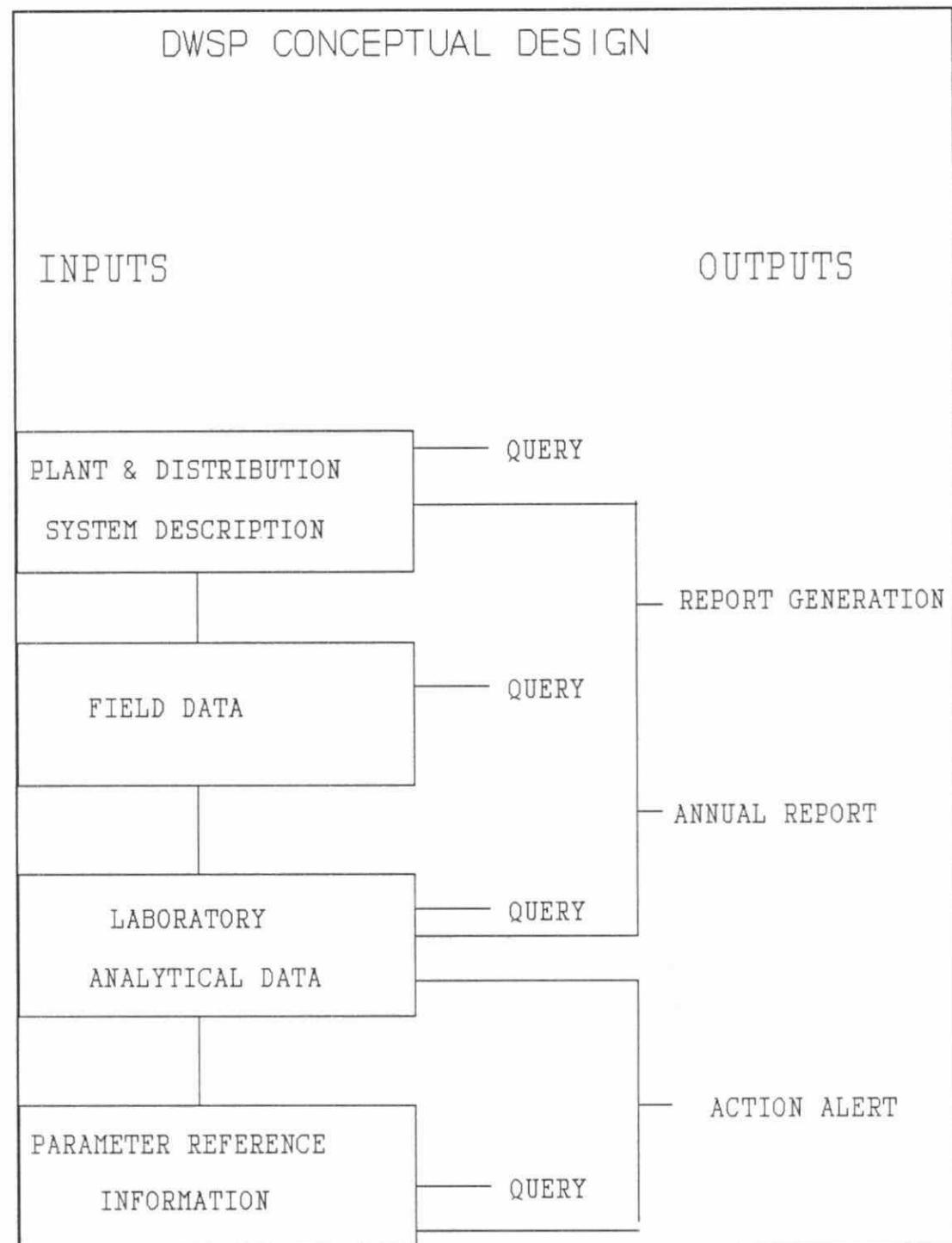


FIG. 2

## MOE - DRINKING WATER ASSESSMENT PROGRAM (DWSP)

(B2001P)					PARAMETER
REFERENCE					
BENZENE					

SOURCE	FROM	TO	METHOD	TARG	UNIT	NOTE
EPA	C	86/04	NOMETH	.00	063000 UG/L	RMCL
EPAA	C	80/11	NOMETH	6.60	063000 UG/L	
FERC	C	84/05	NOMETH	1.00	063000 UG/L	
WHO	C	84/01	NOMETH	10.00	064000 UG/L	

DESCRIPTION: NAME: BENZENE

CAS#: 71432

MOLECULAR FORMULAE:  $C_6H_6$

DETECTION LIMIT: (FOR METHOD POCODO) 0.05 UG/L

SYNOMYS: BENZOLE, COAL NAPHTHA, CARBON OIL (27), CYCLOHEXATRIENE (41)

CHARACTERISTICS: COLOURLESS TO LIGHT YELLOW, MOBILE, NON-POLAR LIQUID, OF HIGHLY REFRACTIVE NATURE, AROMATIC, VAPOURS BURN WITH SMOKING FLAME (30)

PROPERTIES:

SOLUBILITY IN WATER: 1780-1800 MG/L AT 25 DEG C (41)

THRESHOLD ODOUR: NO DATA

THRESHOLD TASTE: 0.5 MG/L IN WATER (39)

ENVIRONMENTAL FATE: MAY BIOACCUMULATE IN LIVING ORGANISMS, APPEARS TO BIOACCUMULATE IN ANIMAL TISSUES THAT EXHIBIT HIGH LIPID CONTENT OR ARE MAJOR METABOLIC SITES (LIVER, BRAIN), SMALL QUANITIES EVAPORATE FROM SOIL OR DEGRADE QUICKLY SOURCES: PETROLEUM REFINING, SOLVENT RECOVERY, COAL TAR DISTILLATION, FOOD PROCESSING, TANNING.

USES: PREPERATION OF ETHYL BENZENE USED AS A STYRENE MONOMER, DETERGENTS, NYLON, AS INTERMEDIATE IN PESTICIDE PRODUCTION, SOLVENT IN RUBBER INDUSTRY, DEGREASING AND CLEANSING AGENT, GASOLINE.

TOXICITY: RATING 4 (VERY TOXIC); ACUTE - IRRITATES MUCOUS MEMBRANES, SYMPTONS INCLUDE RESTLESSNESS, CONVULSIONS, DEPRESSION, RESPIRATORY FAILURE; CHRONIC - ANEMIA AND LEUKEMIA (45).

CARINOGENICITY: HUMAN CARCINOGEN AND MUTAGEN

REMOVAL: GAC ADSORPTION, PRECIPITATION WITH ALUM FOLLOWED BY SEDIMENTATION, COAGULATION AND FLOCCULATION, SOLVENT EXTRACTION, OXIDATION (41).

MOLECULAR WEIGHT: 78.12 GRAMS

MELTING POINT: 5.5 DEGREES C (27)

BOILING POINT: 80.1 DEGREES C (27)

SPECIFIC GRAVITY: 0.879 AT 20 DEGREES C (27)

VAPOUR PRESSURE: 100 MM AT 26.1 DEGREES C

HENRY'S LAW CONSTANT: 0.00555 ATM M<sub>3</sub>/MOLE

LOG OCT./WATER PAR.COEFF:K=1.0 1/N=1.6 R=.97 PH=5.3

Appendix B

DWSP SAMPLING GUIDELINE

i) RAW and TREATED at PLANT

General Chemistry	-500 mL clear plastic bottle -rinse bottle with sample three times and discard water -fill to line
Bacti	-250 mL clear glass bottle with white seal on cap -do <u>not</u> rinse bottle; preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL clear plastic bottle with white lid -rinse bottle and cap three times, discard -fill to line -add 10 drops nitric acid <b>(Caution:</b> HNO <sub>3</sub> is corrosive)
Volatiles (OPOPUP)	-250 mL clear glass bottle -do <u>not</u> rinse bottle -tilt bottle when filling -fill bottle completely; there should be no air bubbles.
Organic (OWOC), (OWTRI), (OAPAHX)	-1 liter brown glass bottle per scan -do <u>not</u> rinse bottle -fill to approx. 1" from top -when 'special pesticides' are requested three extra bottles per sample must be submitted
Cyanide	-500 mL clear plastic bottle -do <u>not</u> rinse bottle -fill to approx. 1" from top -add 10 drops sodium hydroxide <b>(Caution:</b> NaOH is corrosive)

Mercury

- 250 mL clear glass bottle
- rinse bottle and cap three times, discard then fill to top of label
- add 20 drops each nitric acid and potassium dichromate
- (Caution: HNO<sub>3</sub> and KCrO<sub>7</sub>, corrosive)

Phenols -250 mL clear glass bottle  
-do not rinse bottle  
-fill to top of label as marked

## Steps

1. Let cold water tap run for several minutes.
2. Record time in submission sheet.
3. Record teperature on submission sheet.
4. Fill up all bottles as per instructions.
5. Record chlorine residuals (free, combined and total for treated water only), turbidity and pH on submission sheet.

ii) Distribution Samples (standing water)

General Chemistry	-500 mL clear plastic bottle -rinse bottle with sample three times and discard -fill to line
Metals	-500 mL clear plastic bottle with white lid -rinse bottle and cap three times, discard -fill to line -add 10 drops nitric acid <b>(Caution: HNO<sub>3</sub> is corrosive)</b>

Steps:

1. Record time on submission sheet.
2. Place bucket under tap and open cold water.
3. Fill to predetermined volume.
4. After mixing the water, record the temperature on the submission sheet.
5. Fill general chemistry and metals bottles.
6. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

iii) Distribution Samples (free flow)

General Chemistry	-500 mL clear plastic bottle -rinse bottle with sample three times and discard water -fill to line
Bacti	-250 mL clear glass bottle with white seal on cap -do <u>not</u> rinse bottle; preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL clear plastic bottle with white lid -rinse bottle and cap three times, discard -fill to line -add 10 drops nitric acid <b>(Caution:</b> HNO <sub>3</sub> is corrosive)
Volatiles (OPOPUP)	-250 mL clear glass bottle -do <u>not</u> rinse bottle; preservative has been added -tilt bottle when filling -fill bottle completely; there should be no air bubbles
Organic (OWOC), (OWTRI)	-1 liter brown glass bottle per scan -do <u>not</u> rinse bottle: preservative has been added -fill to approx. 1" from top
Cyanide	-500 mL clear plastic bottle -do <u>not</u> rinse bottle: preservative has been added -fill to approx. 1" from top -add 10 drops sodium hydroxide <b>(Caution:</b> NaOH is corrosive)
Mercury	-250 mL clear glass bottle -rinse bottle and cap three times, discard then fill to top of label -add 20 drops each nitric acid and potassium dichromate <b>(Caution:</b> HNO <sub>3</sub> and KCrO <sub>7</sub> corrosive)

Steps:

1. Record time on submission sheet.
2. Let cold water flow for ten minutes.
3. Record temperature on submission sheet.
4. Fill all bottles as per instructions.
5. Record chlorine residuals (free, combined and total),  
turbidity and pH on submission sheet.

**TD  
380  
.088  
1988**

Ottawa (Lemieux island) water  
treatment plant : annual report  
1987.  
79154